

# **The American Journal of Pharmaceutical .... Education ....**

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**THE OFFICIAL PUBLICATION OF THE AMERICAN  
ASSOCIATION OF COLLEGES OF PHARMACY**

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**"In the practice of any profession there is ample room for specialization, but in educational preparation for that practice breadth of training and understanding should be the outcome, and arbitrary compartmentalization is opposed to broad understanding."—George D. Beal, Mellon Institute of Industrial Research.**

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**Volume XV**

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# THE AMERICAN JOURNAL

## OF

# PHARMACEUTICAL EDUCATION

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## Edward Kremers Memorial Lecture\*

**GEORGE D. BEAL**

**Assistant Director, Mellon Institute, Pittsburgh, Pa.**

It is nine years since Edward Kremers passed away. With him passed an era of pharmacy. He was one of the last of the old school of pharmaceutical scientists. Dr. Urdang, given the good fortune to be Dr. Kremers' literary executor, and having at hand his correspondence as well, has written of his contributions to pharmaceutical science and education with such careful analysis that it would be presumptuous of me to attempt any re-appraisal. I think I know something of the spirit that moved Dr. Kremers in his devotion to pharmaceutical science, because of our family friendship and my great admiration for him and his contemporaries, and also because I have known some of the same sort of people that he knew, and in that way learned of the men of an earlier age whose scholarship inspired him. Let me therefore, as a devoted friend from pharmacy's borderland, speak of some of the things that I see today and in retrospect.

Dr. Kremers' first pharmaceutical preceptor, Louis Lotz, had Justus von Liebig as a chemistry teacher. As a graduate student in chemistry my last course of lectures was given by the dean of American industrial chemists, Charles Frederick Chandler, for the better part of a half century head of the Department of Chemistry at Columbia University. Chandler received his doctorate at the German University of Göttingen in 1856, preceding Kremers by thirty-four years. While not a student of Liebig, he did hear that great master lecture in his declining years. His work in organic chemistry was under Friedrich Wöhler, and his thesis, in analytical chemistry, under Heinrich Rose.

Kremers, inspired by his early preceptors, was not satisfied until he had traveled to Germany to study the chemistry of the terpenes under Otto Wallach. When Wallach was called to Göttingen to take the chair of organic chemistry made vacant by the

\* Sponsored by Rho Chi Society, School of Pharmacy, University of Wisconsin, Madison, Wisconsin, November 2, 1950.

suicide of Victor Meyer, he succeeded to the position once held by Wöhler, and Kremers went with him, receiving his degree from that great institution in 1890.

Kremers' teacher in pharmacy at Wisconsin was Frederick B. Power, who at Wisconsin, and later, as director of the research institution founded in London by, and bearing the name of, his friend Henry S. Wellcome, a Wisconsin farm boy who stood before kings, developed a system for determining the constituents of plants in which he dared to make analytical separations upon many kilograms of materials instead of the thimbles full commonly studied by chemists. Kremers was also a disciple of Albert B. Prescott, the Michigan physician turned pharmacist and organic chemist, but who is remembered by most as the senior author of a classical textbook of qualitative analysis.

My professor, Chandler, regaled us with many of his experiences and meetings with the great chemical names of the old Germany. I remember particularly his account of his first meeting with his major professor, Heinrich Rose, who first expressed his pleasure at having another student from America, then told Chandler, as his first exercise, to go to the cellar of Rose's home, scrape some of the efflorescence from the stone wall, and make a complete qualitative and quantitative analysis of it. I recall the description vividly, but failed to record the conclusion in my lecture notebook, so I cannot tell you today whether it was sodium sulfate or calcium nitrate.

The persons who greatly influenced Chandler, like those who influenced Kremers, were most interested in natural substances, and insisted on analytical thinking as well as experimentation. There was a wealth of natural material for study, and interest in synthetic chemistry, then developing, was aroused as a means of unraveling the constitution of these natural substances. In 1887, the year before Kremers sailed for Europe, there appeared the first volume of the *Zeitschrift für Physikalische Chemie*, containing Arrhenius' paper on the *Electrolytic Dissociation Theory*, laying the foundation for modern physical chemistry. This new chemistry was represented at Göttingen by a young man, Walther Nernst, who made the young Kremers acquainted therewith.

One gains the impression that research on natural substances today is far less voluminous than during Kremers formative years.

Probably what we see most distinctly, but fail to interpret correctly, is the decrease in *proportion* of such papers. Even the biological chemistry of that time was grossly analytical, with only a few advanced thinkers pondering the physico-chemical treatment of physiology that is the biochemistry of today. It was logical enough that theoretical chemistry had to await the accumulation of an adequate volume of descriptive chemistry. The taste for speculative reasoning that was inaugurated by closet philosophers is not attractive to those who have tasted experimental methods.

Kremers' predecessors were interested in preparations of natural drugs that were effective against disease and as pleasing as possible to the patient. Kremers' generation devoted themselves systematically to the isolation and identification of what were believed to be the active principles of these drugs. His successors have, by more critical chemical and pharmacodynamic methods, established first the potent structural groups in these active principles, then by chemical construction and reconstruction have augmented the physiological effects, removed unfavorable side reactions on the animal body, and in many instances increased their specificity. Finally, just as it appears that all future conquest of disease will come from the synthetic laboratory, a host of new anti-infective and regulatory agents of glandular origin, or derived from the microscopic vegetable kingdom, force themselves upon us and start the cycle of investigation anew.

Young Kremers first became acquainted with the Pharmacopeia as U.S.P. VI, of 1880, published in 1883 under the chairmanship of Charles Rice and the vice-chairmanship of Joseph P. Remington. This pharmacopeia is a land-mark among those who have been active in drug standardization because it was the first to suggest our pharmacopeias of today in either style or content. A comparison of its content, however, with U.S.P. XIV which became official yesterday, is illuminating as regards changes in types of drugs in use and forms of medication prescribed. The source of most simple drugs was Mother Nature. U.S.P. VI recognized 218 so-called vegetable drugs, while U.S.P. XIV recognizes 31. Of substances properly termed inorganic, U.S.P. VI contained 179 while U.S.P. XIV admitted only 87. U.S.P. VI has 44 organic chemicals in addition to 28 alkaloids and alkaloidal salts. U.S.P. XIV has 157 organic compounds of the same

miscellaneous classifications, 36 alkaloids or salts thereof, and 11 sulfas, 11 anti-infectives, 14 vitamins, and 10 hormones, for a total of 239, with the last four classes unheard of by Rice and scarcely by Remington. Furthermore those 157 miscellaneous compounds include new classes of cardiac glycosides, barbiturates, and local and general anesthetics for use subcutaneously, intravenously or by inhalation, the only two of them described in U.S.P. VI being chloroform and ether. There are also antihistaminics, antispasmodics, and, in the words of the auctioneer, other articles too numerous to mention.

Immunology was of no importance in U.S.P. VI, but in U.S.P. XIV we find 20 serums, vaccines, antitoxins and toxoids, and 7 blood derivatives, some for the aforesaid purpose, the remainder for use as blood substitutes. U.S.P. VI was botanical, mineralogical and chemical; U.S.P. XIV is chemical and biological.

The pharmaceutical aspects of the pharmacopeia have likewise changed. From the large number of official vegetable drugs were made 79 official fluid extracts, 73 tinctures, 32 solid extracts, 14 wines, and 12 abstracts, the last an experimental class of standardized solid extracts dropped thereafter. U.S.P. XIV has 5 fluid extracts, 18 tinctures, no wines and 7 extracts. In addition U.S.P. VI had 22 spirits and 13 aromatic waters, of which 4 and 6 respectively are employed in U.S.P. XIV.

The types of pharmaceutical preparations official in 1883 indicate the extent to which pharmacists were obliged to practice extemporaneous compounding for the benefit of physicians who wrote prescriptions rather than orders for "count-outs" or "pour-outs". They also show the still elementary state of learning, the fact that gross therapeutic properties of drugs were recognized rather than specific ones.

As for the forms of medication used, apparently only the dermatologists have made little change, as the number of ointments has only decreased from 26 to 23. U.S.P. VI contained 15 official pills, U.S.P. XIV has but 1. The old book had 16 troches, the new one two. But the extent to which simple substances are used today in medication is shown by the fact U.S.P. XIV recognizes 92 tablets, 80 injections, and 31 capsules, dosage forms beneath the dignity of the old pharmacopeia.



The atlas of medication presented in pharmaceutical education has undergone a similar revolution. A half century ago the two important subdivisions of this educational field were pharmacognosy and operative pharmacy. Pharmacognosy constituted a discipline with its own set subdivisions; botany, including instruction in microscopy and histology as a technique; pharmacognosy proper, comprising the recognition of drugs in both whole and powdered form; and materia medica, the therapeutic applications of said drugs. Pharmacy began with a series of instructions in pharmaceutical operations, which included the manufacture, on a small scale, of course, of typical pharmaceuticals, aromatic waters, tinctures, fluid extracts, solid extracts and individual dosage forms such as pills and compressed tablets. It concluded, as now, with extemporaneous compounding, presumably in accord with a physician's order.

Currently the amount of time devoted to these topics in the baccalaureate course is probably no greater than in the much shorter curriculums of thirty years ago. With no feeling of nostalgia, however, it is possible to suggest that the former attention to these laboratory details of the science of the apothecary was by no means the worst of educational methods. Just as practice in quantitative analysis inculcates a sense of accuracy, practice in manufacture of preparations in the pharmaceutical laboratory developed the companion sense of elegance and neatness. One may quite properly ask whether today's repeated compounding of simulated prescriptions, the mixing of numerous ointments, etc., provides the same sort of educational experience.

Since the period of Dr. Kremers' active teaching instruction in pharmacognosy has probably undergone the greatest reorganization and reorientation in keeping with modern trends in therapeutics. Because of the more moderate use of vegetable drugs, which seldom come into the hands of the pharmacist, teachers are awakening to the realization that except for pedagogic purposes it is not so necessary to have a speaking acquaintance with all the members of a large family of dried vegetable cells.

I suppose there are very few professions or trades in which some term of broad significance has not been seized upon by a small class and jealousy claimed as their own prerogative. Properly pharmacology is the whole science of the use of drugs, with

medicine and pharmacy as subordinate fields. But the students of pharmacodynamics claim that their area represents all of pharmacology. Pharmacognosy, which properly comprehends the recognition of all drugs, has been held by its practitioners to apply only to the histology of the vegetable drugs, with especial reference to the crude form in which they enter commerce or the manufacturing laboratory. Descriptions of drugs consisting of various animal organs have been provided as required, but description and identification of all other drugs relegated to different fields. As a matter of fact, today qualitative inorganic and organic analysis are the principal means for the recognition of drugs.

Pharmacognosy is undergoing a face-lifting. It may perchance lose its name, being absorbed into what is today called pharmacology, but it will remain a part calling for a keen sense of observation. I believe it is desirable that the general characteristics of drugs be discussed together with their uses. Some have expressed the hope that at least the name pharmacognosy will be retained if only as a means of emphasizing the first syllable.

As the curriculum in pharmacy, the context of the several courses, and the educational bases for the system of presentation are being revised, I hope that we may be able to free ourselves from some of the artificial distinctions that teachers have built up to define, preserve, and copyright their fields of interest. Traditionally introductory mathematics as presented in college comprises the separate areas of algebra, trigonometry, analytical geometry and differential and integral calculus. However, there are only two fundamental mathematical operations, addition and subtraction, condensed to multiplication and division, although elaborated into all of those forms that constitute the higher mathematics. So for some thirty years an increasing number of teachers have been abandoning the old freshman-sophomore classification and teaching an integrated course of college mathematics, introducing each new consideration when profitable and logical, regardless of whether years before it was a part of Math. 2 or Math. 8b.

I never realized what such coordination meant until a student in a class in analytical chemistry, whom I was quizzing about the similarity of the several quantitative halogen determinations, evaded me with, "but that was qualitative analysis". Even after nearly

a quarter-century away from the classroom I wish I could co-ordinate, for a class, all of inorganic chemistry, descriptive and analytical. And because of the persistence of such a belief, I hope to live long enough to see some person throw syllabi to the winds, except as they define the scope of pharmaceutical education, and then come forth with a system of teaching pharmacy that will develop it systematically along, first, the two fundamental lines of chemistry and biology, leading on into the applied lines of pharmacy and economics. In the practice of any profession there is ample room for specialization, but in educational preparation for that practice breadth of training and understanding should be the outcome, and arbitrary compartmentation is opposed to broad understanding.

When Kremers had completed the prescribed pharmaceutical curriculum with the degree of Graduate in Pharmacy, he re-matriculated in the University as a candidate for the degree of Bachelor of Science. According to his own notes, says Dr. Ur-dang, it was his self esteem that caused him to make himself the equal of the non-pharmaceutical students on the campus who looked down on the pharmics with practically no entrance requirements and only one-third of the customary college residence. What other course would be left to a scholar? His European study followed naturally, and the combined impact of his more formalized education gave strength to the conviction that led later to the establishment of his baccalaureate course in pharmacy.

I think the first discussions of problems of pharmaceutical education I understood were those of my father and some of his educator fiends around the turn of the century, and had to do with a movement that seemed to center in the New York State Board of Regents. It was actually proposed that a prerequisite to the course in pharmacy, which could be completed in one year of full-time study, should be the successful completion of one full year of high school. These teachers all favored the requirement, and were endeavoring to practice it themselves. Those of you who know the history of pharmaceutical education are aware that the plan had hard sailing and was not immediately successful. Similar difficulties beset the requirements of the two-year course, the pre-requisite of high school graduation, the three-year course,

and the four-year course with the baccalaureate degree. I read or heard all of those debates.

Last year I attended a conference in which the chairman of the curriculum committee of the American Association of Colleges of Pharmacy elaborated the recommendations of The Pharmaceutical Survey relating to pre-pharmacy collegiate preparation of one or two years, and heard that proposal bitterly attacked. Finally I was moved to come to the aid of the chairman by saying that it was somewhat of a reflection on those opposed to this proposal that they had in fifty years thought of no new arguments against some liberal education for pharmacists. All that was said about a year of high school education in 1900 was that it would make it difficult to obtain clerks, that it would decrease the number of students entering pharmacy, and that the practice of pharmacy did not require such preparation. These same things were publicly said in 1949 despite the fact that it has been proportionately no more difficult to obtain drug clerks, that the colleges are now able to restrict matriculation to applicants from the higher brackets in their high schools, and that they keep the students in college for four years.

No person, of course, has expressed serious doubts as to the wisdom of requiring as much academic and professional training as he himself possesses. Many older pharmacists have been frank to speak of deficiencies in their training, of useless bits of curriculum, and of substitutions that might well be made. It ought to be remembered, when discussing the progress of pharmaceutical education in the United States, that it is only 129 years since the first college of pharmacy was established, and that only during the past half century have the requirements risen from those of the simpler trade school to those of a first class college. I have several times made the remark that in the past twenty years we had four-year graduates under three-year teachers examined by two-year board members, only to be told recently by one board secretary that I had allowed some of his members a bonus of two years.

The four-year curriculum was adopted by the college association as its standard only in 1932. At that time we were just inching our way out of the country's greatest depression, we have since had six years of world-wide war, affecting us badly for two

years before our own entry, and a greatly unsettled period of recovery and world-wide suspicion. If the average student graduates from college at 22, the average graduate from the time these four years became a bona fide requirements has only reached 40. Consequently I have thought that it is early to expect much of an impact upon the general level of the profession, but I have been asked instead in how many other professions I would find so many men of forty already occupying substantial places in their community.

The Pharmaceutical Survey turned its spotlight on many problems in pharmacy, but lingered longest on those relating to pharmaceutical education. Many times I have thought of how Dr. Kremers, had he participated, would have come back again and again to three questions, curriculum revision, graduate study, and teacher training. Curriculum revision is well under way, with its face-liftings, reassignments, elisions and introductions. There is ample room for research on the teaching method. New textbooks, abandoning the traditions of three-quarters of a century, will find an eager reception by teacher and student.

Obviously no school of pharmacy should undertake a program of graduate study until it has put its undergraduate house in the best of order. There are, on the other hand, two compelling reasons why we should have a substantial increase in the number of pharmacy graduates continuing in graduate study. One is the need for better trained teachers. The Council on Pharmaceutical Education has educational standards for teachers that are too frequently satisfied by a rather generous interpretation of "equivalent experience". These teachers have turned out good pharmacists, but not those who have the imagination and fire to lift professional practice above its present level. Most of these teachers have earned their tenure, and are safe in their positions, but for many reasons cannot provide for themselves the necessary material advancement. Furthermore, it is not likely that these persons would inspire young people to take up a teaching career where they would rise above their own level.

Edward Kremers would have distinguished himself in some scholarly way even though he had never been attracted to pharmacy. He might have given himself to art or to some classical pursuit had he been influenced that way, but his love of natural

things would have had a profound bearing upon his achievements. I know a young man who has two generations of science behind him and who all the way through grammar and high school showed every indication of following that tradition. His high school teachers went out of their way to comment on his probable future. Upon entering college, however, he met exceedingly dull science teachers and brilliant, inspiring men in literature. Despite the home influence these practical examples determined the course of his university and professional life. The only part of his early inclination that was not lost was the appreciation for things scientific. Edward Kremers, then, was a contribution from Louis Lotz, Frederick Power and Otto Wallach just as certainly as though he had been a joint paper bearing such a by-line.

It is not too difficult to find teachers who are conscientious in the performance of routine duties, who faithfully herd their students through the minutiae of the syllabus, paying every attention to details of laboratory technique as well as theory, and even wear themselves out in worry and overtime to be certain that the students assigned them pass on to the next course. The tragedy is that among these licensed guides there are not more explorers. A man like Kremers could see in a young man, headed for public school work, possibilities as a teacher of pharmacy and gather him in. He could inspire any young person of latent possibilities to fit himself for a life of professional service.

A vital need of pharmacy is an earnest recruitment campaign among students, inducing those of promise to continue with graduate study leading to a future in scientific pharmacy, either as educators or in research, or both. There is a too material temptation to pharmacy graduates to step directly from the commencement platform into retail practice. Salaries are attractive, and the business future appears bright. The futures offered in teaching and research should be made attractive to these students at that time. I discussed with a friend the other day why it was that there was a so much greater inclination on the part of chemistry seniors to look forward to graduate study. "Well," he said, "I think there are two reasons. One is that their teachers believe in it so thoroughly. The other is that chemists, in general, look up to those who have as students mastered the higher levels of their science." When a Dean tells me that he cannot interest his students in avail-



able graduate scholarships or in teaching assistantships carrying graduate school privileges, he is confessing that his faculty has failed him.

One difficulty undoubtedly is that the student, the average practitioner, and the public have in their minds that the only person who practices pharmacy is the man they meet in the retail store. On the contrary, the functions of pharmacy include every step in the collection, manufacture and preparation of drugs and their compounds; their development, their control, both in manufacturing and in law; their distribution, wholesale and retail; and the promotional phases of distribution; all of these, and pharmaceutical education. There is no reason why the pharmaceutically educated are not today the most intimately connected with industrial pharmacy, except for the fact that comparatively few over the past fifty years have prepared themselves for it.

While the majority of the colleges of pharmacy are making worthwhile contributions, most have been to the distributive phases of the industry. The graduate divisions of chemistry, on the other hand, with Wisconsin well in the foreground, can point to many successful participants in pharmaceutical industry, including most of the brilliant contributors to chemo-therapy. There is no doubt about the opportunities in the scholarly phases of pharmacy for those of pharmaceutical antecedents who have the proper training, if they will seize the opportunity. I know of no reason, for example, why a student with a B.S. in Pharmacy should hesitate to take up graduate work in the chemical and biological aspects of pharmacy. It is my experience that they are well prepared to enter at once as junior members of a research team because of the number I have so employed. Nor do I know of any reason why they should fear to enter upon the few courses that will have distinguished an undergraduate chemistry curriculum from theirs.

In his notable statement of the origin and aims of The Pharmaceutical Survey, the Director, Dr. Elliott, had this to say:

"The distinctive and historic professional responsibility of the individual practitioner of pharmacy—that of the compounding of medicines for the physician's prescription—was diminished by the development of large-scale, scientifically controlled production and distribution of medicinals. At the same time his professional

responsibility was enlarged by an ever increasing number of new therapeutic agents and by the development of modern diagnostic methods and tests. For the preparation of many of these therapeutic agents new technical knowledge, and complex mechanisms not usually possessed by the individual pharmacist, were required."

This is not an apology for any shortcoming of Pharmacy, it is an explanation of the drift of the manufacture of modern medicinal preparations. The development and clinical evaluation of these is just as much beyond the comprehension of the chemist or the physician with the same calendar time devoted to his professional education.

Dr. Elliott continued: "Scientific progress and economic changes served both to expand and to rearrange the structure of pharmacy. The individual pharmacist became less a compounder of medicinals and more a scientific purveyor and technical adviser. Specialization in various phases of pharmacy increased as did specialization in many other technical and professional activities. Obsolete medicaments and methods gave way to the new. The scope of scientific knowledge required by the pharmacist expanded, and his opportunities for application of professional abilities increased in number, though changed in form."

Dr. Elliott concluded this phase of his comments thusly: "There was an old profession of pharmacy. There is coming to be a new profession of pharmacy—Although many of the elements of the old profession remain, the new profession tends to assume a distinctive form and unique functions."

Sometimes the lifeblood of a science seems to have ebbed away but for a few drops. The most potent of those remaining drops were Dr. Kremers and his students. The shifting generations of teachers and students do not require the years of fathers and sons. Consequently the almost fifty years of his activity and the comparatively few years that have followed have made it possible for his influence to be broadly felt in the educational system of pharmacy.

The transition from pharmaceutical science to scientific pharmacy has been an evolution that has retained certain dominant characteristics of the old form and has adapted itself to modern conditions while acquiring new characteristics. Dr. Kremers has been one of the direct links to those who laid the scientific

foundations for developments in the name of pharmacy for healing the sick. He probably did most to perpetuate a tradition of scientific scholarship that has led pharmaceutical education through changing times to a greatly deserved professional recognition. This recognition of his life and work by the Rho Chi Society is a fine and gracious tribute.

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## Methods and Aims in Modern Scholarship\*

DR. GEORGE P. RICE, JR.

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The clear high minds which made and directed the policies of Athens during its Golden Age held the welfare and advancement of the commonwealth the first responsibility of the citizen. Men were proud and eager to serve alike in the deliberative assembly and on the battlefield. Neither were they wanting when the needs of the state required large portions of their wealth. Leadership was awarded on the basis of merit, Pericles tells us, and humble birth was no deterrent to the able and ambitious. The Athenians trained long and arduously for the exacting duties of citizenship. A sound mind in a healthy body was their goal, and the young men divided time equally between academy and gymnasium. The judicious exercise of talented intelligence of its people brought to Athens long periods of intellectual and political dominance. Other and later states, Rome, the Italy of the Renaissance, England, and the United States, prospered similarly when they were wise enough to follow the Greek example. It became recognized that that polity was ruled best whose government was in charge of guardians qualified equally by high moral standards and trained intelligence.

\* An address delivered before the College of Pharmacy at Butler University, October 5, 1950; later at Siena College, Albany, N. Y., on October 27; and again before the Alumni Association of Columbia University of Indianapolis, November 18. Professor Rice is chairman of the Department of Speech and Drama of Butler University and Educational Director of the National Foundation for Education in American Citizenship.

Today this nation is face to face with a crisis international in its magnitude. Proposals for defense emphasize scholarship as the key to determine who will spend his time in the classroom and who will proceed to military installations. It follows that members of campus communities everywhere are interested in the rights and duties of the calling they profess; hence, we are justified at this time in examining the implications of the term scholarship, methods which tend to produce it, and the ends to which it should be directed.

In general we may say that the scholar is one who makes industrious use of his leisure in order to advance the frontiers of human knowledge aesthetic and useful. He is a person in whom Nature and Nurture have been happily combined, for he is endowed with a high potential of intelligence and has had the good fortune to receive instruction from the noble living and the noble dead. In the ideal state, Emerson tells us, "the scholar is man thinking." Such a one fulfills the promise of his youth in the years of maturity; he exercises creative imagination in order to form new concepts; he gathers evidence with strict regard for accuracy and truth; he judges his peers impartially and submits his own work to their discipline. Above all, he shares the fruits of his studies, hoping thus to assist the progress of others even as he had been helped. He is also, as Emerson pointed out, a man of action at need, one who seeks steadily to express the virtues of the Homeric hero as "a doer of deeds and a speaker of words." He shows himself everywhere a man of intelligent good will, seeking happiness for himself and for others because he knows that true perspective of men and ideas comes only to him who is free from distorting pressures resulting from fear and worry. He cultivates various disciplines besides the one in which he holds himself competent. Such a man is, moreover, aware of two audiences when he speaks and writes: there is the immediate, which hears his words and reads his books at once, and the remoter as yet unborn judges, who will examine his ethical and intellectual stature in the light of historical perspective.

As the scholar gains wisdom through experience, he becomes aware of another important obligation on his part; he must select, train, and encourage able young men and women who will succeed him in the fullness of time. He will not try to gain reputation or

extend his influence by gathering the unfit many about him; rather, he will seek and instruct the gifted few. He will remember, as did Scaliger, Boeckh, Agassiz, Koch, Shaler, and Pasteur, that only the opportunity for education is democratic, that not all who are eligible can benefit to the same degree by instruction. And there will be in our scholar a keen awareness of the basic truth of the Aristotelian dictum that the pleasure of learning, the desire for transfer from a state of ignorance to one of knowing, is a fundamental drive in human conduct.

The able scholar is possessed of the power to think and act with independence. He will be remarked by those traits of individuality which so peculiarly distinguish nobility of intellect: the awful patience of the men and women whose researches in science earned them Nobel Prizes; the self-denial and persistence which enabled Marie Sklodovska to live in Paris in 1892 on three francs a day while studying chemistry and physics at the Sorbonne; the capacity for broad vision, supported every step of the way by introspection and minute investigation shown by Newton and Einstein; and the acumen to observe the limits of his power and to undertake good and useful tasks within them. Hear what George Saintsbury, able teacher and discerning critic of literature, says on this point: "At a very early time of my life it was, as the old phrase goes, borne in upon me that I was not destined to create great literature but that I could to some extent assist that appreciation in others." That "appreciation in others" was assisted over the years by a great number of books, essays, and lectures; his tasteful industry earned for this scholar an enduring measure of fame.

The pattern of thought and action described here marks the extraordinary man. But it is high time to assign signal importance to the gifted and to place less emphasis upon the common. Too much has been said and written about "the century of the common man," another label for the cult of mediocrity.

What are some specific suggestions which, if followed diligently, will promote the spirit and achievements of scholarship among you? For one thing, we need an improvement in our intellectual atmosphere. Let there be a resurgence of the spirit of free inquiry once characteristic of the New England town meeting, and let there be more institutions like the Institute for Advanced

Study at Princeton; and let other colleges and universities follow the example of General Eisenhower at Columbia in establishing "common sense forums" to bring the best minds of our time to the pressing problems which concern it.

Certain good advice which the writer had of Professor Lane Cooper at Cornell University is pertinent here.

1. Read to become a good and useful citizen.
2. There is need for the good student in science to read more because the average liberal arts student does not read enough.
3. Read aloud, often, as did your ancestors. And read from the Bible, Homer, Dante, Spenser, Shakespeare, Milton, and Wordsworth, among others.
4. Read the printed page with all your bodily senses and with the mind's eye; try to make the contents come to life again as they did when the writer first put them down.
5. Read with proper attention to the mechanics of the printed page—type, punctuation, and capitalization.
6. Place several good books on a small stand at the head of your bed; read ten or fifteen minutes nightly before retiring; you will cover six major authors in a year by this device.
7. Read in the company of others whenever possible.
8. Select one author and know him well; study his life, works, and influence upon his contemporaries and upon the present.
9. Practise purchasing good but economical editions of classic works.
10. Know some large library intimately.

One result of such reading, carried on systematically over the years, is that a student has access to the rich storehouse of knowledge and wisdom accumulated by the cultivated minds which preceded him. Other dividends will include a treasure of useful quotations appropriate for the embellishment of writing and speech.

The young student of science will do well to remember that the great humanists held science in high repute. Plato was a mathematician, Aristotle an able physicist and anatomist; Da Vinci was engineer and inventor; Milton understood mathematics, astronomy, fortification, and navigation. In the light of this information, let him not flout the study of classical and modern languages and literatures; let him seek the delights of philosophy, an intelligent awareness of history, and the pleasures of a graceful and flowing diction in the use of his native tongue. As his power to create and appreciate grows, he will value the ability to



from noble and elevated conceptions powered by the drive of passionate conviction in his own communications and in his hearing and reading of those of others. He will seek to place the correct word in the proper place in his sentences, and he will appreciate, too, the architectonics of a given piece of writing in whatever genre.

Although his decision was to devote himself to an exact discipline, the young scientist will know that the measure of his personal contribution to life of his time will be found among these:

1. An intelligent awareness of the contributions of the Greek mind to western culture.
2. Some progress toward the ultimate mastery of external nature by man.
3. Discerning regard for his native tongue and serious interest in the production of a common language to serve as medium of communication for all men in order to promote peace, advance knowledge and establish good will.
4. His relation to divine, human, and natural law.
5. The importance of certain intellectual and emotional sanctions in the culture of the West; the reverence for the word of God; respect for the wisdom of the ancestors; the value of reflective thinking; the love of country; and the concept of justice for all men under the law.

He who possesses and exercises the moral and intellectual qualities implied by these standards will find in contemporary times the supreme challenge to his faith and abilities. Not since the emergence of Europe from the Middle Ages into the bright light of the Renaissance has the gifted class of thinkers and doers of the first rank been brought face to face with so many freedoms and consequent responsibilities: the advent of the Atomic Age and the need for wise control of a new and immense source of power; the vital and still pending decision as to whether conflict or cooperation is to be the scheme in the struggle between capitalism and communism; the great need for subordination of technical to humanistic values in modern society; the maintenance of a proper balance among the interests of society, management, and labor; the spiritual and material regeneration of Europe; the practice throughout the world of the Four Freedoms; establishment of a practical national economy in which the management of a colossal debt can be attained; eradication of gross political immorality in

certain parts of the fabric of our democracy; and the encouragement of men and women of high moral and mental stature to enter the public service.

Finally, the enterprising student will learn of truth, justice, love, and beauty with the help of writers of prose and verse, of Plato, Virgil, Dante, Goethe, and others. If he will follow their inspired teachings, there will unroll before him the long history of the past of his race—the great ages of the gifted generations. He will come to understand the place of each as a link with the great past, the busy present, and the unknown future. If he gains insight into the cultures which produced Isocrates, Cicero, Abelard, Lord Chesterfield, Abraham Lincoln, and Winston Churchill, he will have done all that may reasonably be expected and may hope to come into understanding contribution to his own.

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## An Experiment in Teaching Drug Store Management at Utah\*

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Although considerable progress has been made in broadening the scope of the pharmaceutical curriculum it is recognized that the training offered pharmacy students in business is necessarily limited. Some colleges of pharmacy recognized as early as 1900 that with the great majority of their graduates going into retailing, students should receive some training in the economic and business problems they might be expected to meet. Formal training of college grade in business itself has had a history of scarcely more than sixty years. Nevertheless at present the college course in business has a minimum term of four years, and this can be followed by graduate courses of one or two years or even

\* Presented at the meeting of District No. 8 of the Boards and Colleges of Pharmacy, October 13, 1950, Sacramento, California.

longer. Therefore, it is evident that the training in business principles and methods which can be given to a student in a four-year or even a six-year pharmacy course is limited and at best rudimentary. Unfortunately, many of those colleges offering courses in the operation of a retail drug store do so in a rather half-hearted manner and usually assign the instructional responsibilities to a younger staff member without formal business training.

The purpose of this paper is to review the circumstances under which a formal course in drug store management was developed at the University of Utah and to outline how it was integrated among specialists in the field of drug store operation. It should be emphasized that the course content is not necessarily new or different, but the organization of the course offers a new approach for teaching drug store management in colleges of pharmacy.

In September 1948, the President of the Utah Pharmaceutical Association created a "Student Enlistment and Placement Committee." The committee membership consisted of the general manager from each of the three wholesale drug companies in the state, the district manager of the principle drug chain store system, a professional pharmacist, a retail pharmacist, and a representative from the Allied Drug Travelers, with a faculty member of the College of Pharmacy as Chairman. The expressed function of the committee was to "work with the University in problems relating to student enlistment, student placement and the building of good will."

In view of the large enrollments in the Colleges of Pharmacy this committee considered their primary objective to be the proper placement of graduating pharmacists. It was anticipated that anything which would aid in successfully placing and orienting students in the profession of pharmacy would reflect to the credit of the institution in the form of good will. In order to approach this problem objectively a joint meeting was arranged for all agencies concerned with the placement of graduating pharmacists. Present at this meeting were the Dean of the College of Pharmacy; the Director of the University Placement Bureau; the President of the Utah Pharmaceutical Association; and the members of the Student Placement Committee. As the discussion of placement problems progressed and the various members contributed ideas

it became apparent that the effective placement of a student in his chosen profession was dependent upon his knowledge of the opportunities in the field and what was expected of the pharmacist in the various positions. With this thought in mind complete agreement was reached on several points. (1) An orientation course is essential for a more practical placement of students and the building of successful careers in pharmacy. (2) In view of the fact that the majority of pharmacists practice in retail drug stores this course should stress all phases of retail drug store operation. In addition, it should not only acquaint the student with what is expected of him as an employee, but also what he should expect of his employer. (3) Practicing pharmacists representative of different lines of pharmaceutical endeavor should actively participate in presenting the course material. (4) The most desirable time for requiring this course is during the final quarter of the senior year.

As a result of these suggestions a joint meeting of the Deans and Faculties of the College of Pharmacy and the College of Business was held in order to devise a method for effectively achieving these objectives. It was the opinion of this group that Drug Store Management was a specialized subject and should be in direct charge of a specialist in the field of Business Management. Likewise it was agreed that active participation by successful professional pharmacists was necessary in order to correlate theory with practice. Therefore, the Head of the Department of Marketing and a specialist in retail operations was assigned to the College of Pharmacy for the express purpose of organizing and directing such a course. Assisting this man were three successful, outstanding Utah pharmacists representing small retail, large retail, and professional pharmacy respectively. These men were selected on the basis of their training and experience in operating the above mentioned type of store. They were assigned sections of the course dealing with the operations with which they were specialists. In order to assure adequate attention to their instructional responsibilities these men were placed under contract by the University and adequately compensated for their time. In addition, representatives and company executives representing practically every phase of drugdom were invited in to acquaint the students with the opportunities in their particular field of special-

ization. This course was offered for the first time during the spring quarter of 1950. One hour class periods were held each day throughout the quarter and the students successfully completing the course were given five quarter hours of credit. Thus, approximately sixty hours of instruction were devoted to the following topics.

**Course Outline**

**DRUG STORE MANAGEMENT**

**Introduction**

1. Pharmacy as a career
2. Opportunities in Pharmacy
  - Teaching
  - Government services
  - Manufacturing
  - Research
  - Detailing
  - Hospital
  - Professional
  - Retail

**Beginning Operations in Retail Pharmacy**

3. Getting started in the drug business
4. Selecting the form of business organization
5. Acquiring and financing the store
6. Store building and construction features
7. Drug store planning and layout

**Salesmanship**

9. Effective drug store salesmanship
9. Being selling conscious

**Buying and Pricing**

10. Buying goods that will sell
11. Buying the right quantity
12. Pricing to yield a profit

**Merchandising**

13. Sales promotion—Advertising and Store
14. Sales promotion—Window and Display
15. Merchandising proprietary medicines, hospital supplies and baby good
16. Merchandising cosmetics and toiletries
17. Merchandising photo supplies and equipment.
18. Merchandising candy, tobacco, and sundries
19. Merchandising the soda fountain

**Employee Relations**

20. Selecting, training and supervising
21. Paying employees
22. Evaluating the work of an employee
23. Drug store routine and housekeeping

**Other Important Factors**

24. Store policies that produce profits
25. Accounting records
26. Outside helps to guide the business
27. The importance of salesmanship
28. Legal principles for the pharmacist and specific laws affecting drug stores
29. What kinds of insurance should be carried
30. Code of ethics

In addition to these topics consideration was given to other items of interests to retail pharmacists, such as making application for a position, obligations to the positions, promotion of the prescription department, fair trade, pharmaceutical legislation, pharmacy and socialized medicine. The students were also encouraged to ask questions and present their problems to the entire class for discussion.

As the class progressed it became apparent that the students appreciated frank down to earth discussions concerning the operation of retail drug stores and were anxious to learn all they could from these successful practicing pharmacists. Many times the students would gather about the instructor and continue their discussions for an hour or two after the close of the formal class period. It was also gratifying to hear the practical way in which these men presented their various subjects. For example, when presenting the topic "what does the drug store owner expect of his pharmacist" the instructor displayed a picture of a basket of tomatoes and made the following comparison. "This basket is full of tomatoes which are, from outward appearances, all the same. However, if you were to taste them you would find they differ in texture and flavor and some are better than others. In a short time you will all be registered pharmacists and from the registration certificate granted you will all be the same. Nevertheless, as you enter retail pharmacy your employer will find there are differences in your ability to meet customers, in your attitude toward drug store work and in the professional service



you render. Now I am going to tell you what is expected of you as a pharmacist and if you will listen and act on my suggestions I am sure that when you get on the job your employer will say "that fellow is a good tomato." Such an approach from a professional teacher may seem out of character, but coming from these men it was interpreted as creative thinking. The students recognized these men as successful operators and were therefore willing to accept and listen to their council.

It is of interest to note that the visitation committee of the American Council on Pharmaceutical Education inquired in great detail concerning the organization and operation of this particular course. After personally visiting this class the members of the committee were enthused with its possibilities and encouraged us to continue it on even a larger scale. At the present time plans are being formulated to expand the course material so as to include more details on wholesale, professional service and manufacturing pharmacy. The College of Business has also assigned a regular staff member from their marketing division who will act in an advisory capacity to help coordinate the business training of the pharmacy students. This man, thoroughly familiar with the details of store management, will be available to us in whatever capacity we desire. His first comment after receiving his assignment was, "I consider this association with pharmacy the greatest practical opportunity I have ever had in the field of teaching business organization." In addition, preliminary plans have been made for increasing the number of practicing pharmacists participating in the instructional part of the course and securing for them an appropriate non-tenure academic rank and title.

In conclusion, we think the instructional integration of marketing specialists and practicing pharmacists offers a new approach to successfully teaching drug store management. On the basis of our experience in this course we feel that this approach should be employed in other pharmaceutical areas. For example, it is suggested that specialists in business law and successful professional pharmacists be integrated in the instructional program for effectively teaching pharmaceutical law.

## A Mission To Oxford

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As a part of the many academic and ecclesiastical interests associated with Oxford University, England, particularly its separate twenty-one or more colleges, is the Oxford Medicinal Plant Scheme, under the capable direction of the famous plant physiologist and biochemist, W. O. James. It fell to our good fortune during August 1950 to be invited to examine the laboratory activities there, and to participate in several discussions over a two-week period with the Oxford Medicinal Plant Group. This constituted one of the high lights of our brief, but rather broad, coverage of several phases of pharmaceutical activities which play so important a role in health activities of the British Isles. Other points of interest included, prior to our sessions at Oxford, were the activities of several community chemist shops (pharmacies), such as the famous Boots Chemists, two drug farms, and visits with several of the faculty of the London School of Pharmacy.

To the uninitiated it might appear rather vexing for one to speak of pharmacy at Oxford, for in reality, there is no college of pharmacy located on that University campus. Nor is there a medical or dental school. And yet, the Oxford system is quite unique for, along with the development of its renowned educational scheme in the classics, the humanities, and social sciences, Oxford scholars in the basic sciences have become equally famous. Here one has only to recall the many contributions emanating from laboratories of Burn and Finney in pharmacology, Le Gros Clarke and Hinsaw in anatomy, Sir Robert Robinson and James in botany and plant physiology, to mention but a few which have stimulated thought during scientific investigations in pharmaceutical fields. These laboratories, along with those in biochemistry, physiology, and zoology, make up the large portion of the biological and medical science area of Oxford University. In this respect, although they are not organized into a medical or health science school, they may be compared with basic science departments of the average American medical school, or with science divisions of

a university Arts and Science Department. Physically the science area at Oxford is located within easy access of the other college and university activities. At the present time, the botanical laboratories and gardens are somewhat removed from this area, but are to be combined with it in a new building and planting grounds sometime this year. Located on the edge of this compact science area is the famous Radcliffe Library of Natural Science. This is one of the several complete libraries at Oxford, and, although founded long ago by Dr. Radcliffe, physician to William III and Mary II of an ancient British throne, it is housed in one of the newest buildings. Also making up a part of the Oxford science area is the famous University museum. This museum contains many priceless collections of geological, chemical, anatomical, and other scientific interests. We were particularly attracted by the similarity in structure of it with the Harvard Memorial building in Cambridge, Massachusetts.

In finding such an integral basic science group as this, we were better able to understand why a pharmaceutically important project such as medicinal plant study has been established at Oxford. As we learned later, there was a close coordination of study between the pharmacology, biochemistry, and botanical departments. The facilities for drug plant study were further augmented by the large botanical garden area.

It was also interesting for us to learn that, although an undergraduate student of the University might be a member of one of the several tutorial colleges of the University plan, he would engage in science studies in one or more science departments, such as those mentioned above. The graduate student may likewise be affiliated with an Oxford college, or he may be a member of a science department of the University without college associations. Thus it is that during our acquaintanceships at Oxford, we found several Rhodes scholars assigned as graduate students in one of several science departments.

The Medicinal Plant Scheme at Oxford is a research project sponsored by the British Ministry for the investigation of drug plant cultivation and research. One of its many objectives has been to seek fundamental knowledge in the biosynthesis of certain medicinal plant principles, for example, the solanaceous alkaloids and enzymes, also certain amino acid precursors in other plant

families. The project was established during the early period of the past war (1940), and since then, the numerous progress reports coming from the James laboratory have appeared in the form of annual reports or as research papers published in "New Phytologist", "Journal of Biological Chemistry", "American Journal of Botany", "Plant Physiology" and many other similar publications. The research of this group has considerable usefulness for those in plant science, such as plant physiology and pharmacognosy, who seek fundamental knowledge of the formation of plant constituents. In this sense we immediately felt that pharmacognosy was an important phase of the Oxford research and teaching activities. Certainly we found that the laboratory was not aware of activities in pharmacognosy and pharmacology elsewhere, and in other fields of pharmacy. In fact, it was rather evident soon after arriving at Botanical headquarters that our colleagues in pharmacognosy at the London School of Pharmacy, Drs. Wallis, Fairburn, and Rowson, and Dr. Buttle in pharmacology, had participated with James and Burns of Oxford on several exchanges of ideas of pharmaceutical importance. Some of these had obviously taken the Oxford group into several applied fields wherein, for example, the group has completed, among other applied studies, a wholesale reinvestigation of the Vitali-Morin<sup>1</sup> and Kuhn-Schafer<sup>2</sup> methods for the alkaloidal assay of drugs. Among several projects dealing with research of this nature the results of one in particular on the method for the estimation of belladonna and stramonium alkaloids<sup>3</sup> has been made available for the use of the British Pharmacopoeial Society and others. This is fundamentally a refined chromatographic colorimetric and micro-titration procedure which makes use of small quantities (1 Gm.) of drug material. It can be completed in about six hours and has as much accuracy as either the B. P. or U. S. P. present colorimetric assay techniques. It will be recalled that the present official methods require a minimum of about twenty-four hours for completion and a minimum of ten gram sample lots. We found that the Oxford modified method is much more sensitive than either of these official procedures. Trautner and Roberts<sup>4</sup> and Trautner, Neufeld and Rodwell<sup>5</sup> of the Oxford Medicinal Plant Scheme have carried on several adaptations and

modifications of the Robert-James method, and the results of these are of great value to the analyst of alkaloidal principles.

Still another phase of the activities of the Oxford group is their program for the chemical and biological investigation of several more or less obsolete drug plants growing in the Oxford Botanical Gardens or collected elsewhere and brought to these gardens. Such researches are in collaboration with the Oxford Department of Pharmacology and shall not be mentioned further here because of the subsequent publication of them. But the very nature of these investigations is similar to a general trend of research in several pharmaceutical laboratories of America and elsewhere; that is, to scrutinize more carefully the drug actions of plants which have been sent to the archives of therapeutics or which have become museum collectors' items.

The philosophy of research which we found most fundamental among the minds of the Oxford Medicinal Plant Group is not so much analyses, despite the many reports of improved analytical procedures such as have been mentioned. But rather, it is the exploitations of ideas or hypotheses which may lead ultimately to a knowledge of how nature chemically synthesizes certain medicinal plant constituents. This research philosophy is by no means a new approach to the study of plants. It has formed the basis for several reports by other workers during the past twenty-five years<sup>6</sup>. But it requires a keen knowledge of many related fields, especially biochemistry. Its obstacles are many. Such an approach to drug plant research impressed us a great deal before arriving in England and, in reality, was the highlight of our Oxford mission. As we have indicated in a previous publication<sup>7</sup> for the pharmacist it provides a fertile endeavor of research and graduate teaching in pharmacognosy. Probably the highly speculative nature of such investigations presents the greatest interest of all and certainly successful research on biosynthesis can put the lowest and highest evolved of plants into a dynamic position wherein they can be used to demonstrate fundamental secrets of nature.

In more recent years the challenge of alkaloid synthesis in drug plants such as *Atropa belladonna*, *Datura stramonium*, *Hyo-scymus muticus*, *Nicotiana tobaccum*, and related varieties has largely occupied the attention of the Oxford group. Prior to this

period the formation of alkaloids in drug plants has been pretty much dismissed as too difficult to investigate. Alkaloids have been regarded as unapproachable entities which, as James has expressed it, "were considered to lie in a blind alley of nitrogen metabolism whose study could contribute little to the general understanding of the plant." Furthermore, the fact that several investigations have illustrated that alkaloids can be made to be absent in normal alkaloid-producing plants, and present in non-alkaloid yielding members of a related family, has prompted investigators to attribute no functional significance of inherent nature to these principles. Hence, they have been given the by-pass. In accepting the challenge of this seemingly "blind alley", James and his Oxford associates have rationalized that heterocyclic and aromatic rings abound in alkaloid structures and that all alkaloids are associations of nitrogen with carbon and hydrogen. Therefore, these constituents are in rather definite categories during plant metabolism and there is some uniformity in their formation. This would offer possibilities for elucidation of alkaloid synthesis in the living organism were it possible to put the puzzle together by artificial plant growth and precursor feeding experiments. Furthermore, from an applied stand point, the solution of the problem will mean added tools in the form of supplementary plant fertilizers or feedings for increasing alkaloid yields in important drug plants under cultivation. At the moment, although the Oxford Medicinal Plant Group is conscious of the latter and other practical applications in their research, the more fundamental aspects of the study are paramount to them.

The challenge has been accepted and partially met, for in 1949 James<sup>8</sup> was able to report that following feeding experiments with several related amino acids, *L*-arginine and *L*-orinithine gave indications of acting as precursors of the tropane alkaloids formed in young belladonna leaves. We were able to observe the experiments and demonstrations which are continuing at Oxford as the study progresses. Some of these are basically similar to those already underway in our University of Washington Drug Plant Laboratories. Many of the failures reported by the James group are also familiar to us. The progress made by these workers in the field of belladonna enzymes also promises to be a great advance in biosynthesis studies and undoubtedly the current findings of How-



ard and James<sup>6</sup> on a new belladonna enzyme constituent which we were able to observe, will broaden the horizon of knowledge of this perplexing plant activity. This most recent finding is a portion of the Ph. D. (Oxford D. Phill.) research of Mr. William H. Howard, Oxford Rhodes Scholar from the University of Oklahoma, U. S. A.

The equipment being used at Oxford is quite complete. Several Warburg chambers have been improvised, but we were impressed by the extreme care spent on properly calculating their parts such as mercury columns, etc. A micro-titration apparatus was unique in its construction. It is well-diagrammed in the Robert-James paper<sup>8</sup>. British austerity was also evident and unlike many American laboratories, considerable attention was given to collection and re-purification of the several volatile solvents that were being employed. We found that drug percolations were according to the best of pharmaceutical procedure. Much attention was also being given to certain histo-microchemical examinations. Paper partition chromatography was likewise employed very extensively by the laboratory for many amino acid studies.

In addition to its director, the team which is responsible for the Oxford Medicinal Plant Scheme comprises energetic Mrs. Gladys James, wife of Dr. James, Drs. Vernon Butts and William Thewlis, biochemists, Mr. William H. Howard, Rhodes Scholar, Mrs. R. Wilson, two technicians, and also collaborators from the Oxford Botanical Garden Staff under Mrs. Robinson, its curator. Among some of the interesting supportive activities of the group were the researchers of Dr. Butts who is a specialist with paper chromatography and who spent considerable time demonstrating his techniques in developing chromatograms of certain amino acids associated with the barley plant. Mrs. James who had just returned from the International Botanical Congress meetings held in Stockholm during July reported on several papers presented there. Her account of the Russian participation was among the interesting highlights of our symposium. Mrs. Wilson, who has since left the Oxford group, very kindly demonstrated her excellent accomplishments with reciprocal plant grafts. In fact, a small greenhouse structure of the Botanical Greenhouse area was devoted very effectively to this phase of alkaloid study.

Last, but by no means least, mention should be made of the Oxford Botanical Gardens, for it represents a major field area for such a program. These comprise some seven or more acres of gardens, a library, seed collection room, and several large greenhouses. The garden arrangement is according to the conventional taxonomical system of Engler-Prantl and, because of the temperate climate of the English midland area, many exotic specimens were observed. Much of the flora was also reminiscent of that of the New England States and of the Pacific Northwest, particularly Seattle, areas.

And so it goes, a project in medicinal plants unfolds under the very shadows of famous colleges at Oxford. From the picturesque quadrangles of Magdalen College (pronounced Maudalin) founded in 1458 to the more "modern" brick courts of Keble College founded in 1870, plant science breaks bread with the classics. Research is a less sure activity here, but it is loaded with typical British philosophy, for it seeks the fundamentals. In accordance with this, the Oxford group has exploited well a close cooperation with colleagues in pharmacology and biochemistry and those at the London School of Pharmacy. We talked at length with pharmacognosists, Fairburn and Wallis and pharmacologist Buttle of the latter school. Their research likewise was impressive. Fairburn and his workers have delved deeply into the complexity of anthraquinones in plants. Dr. Buttle and his group were at work with antimalarials and anesthetics. In fact, the latter group was involved in problems strongly reminiscent of Minnesota lectures by Jenkins several years ago on quinolines and isoquinolines.

We found in subsequent travels to the Cambridge University Dunn Research Laboratories that here too, many problems in plant biochemistry were under investigation. The work of Mapson, Barker, and Cruckshank on ascorbic acid synthesis in the Gramineae family is extensively published in the literature. This group is also an energetic team and its operations were quite similar to those of the Oxford group.

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## The Significance of Honor Societies\*

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As students of pharmacy you have learned the *receptoriae*, *codexes* and *pharmacopeias* that, from the period of the Renaissance, have endeavored to provide guide books to aid physician and pharmacist alike in prescribing and dispensing drugs to the ailing. At first providing only some uniformity in naming of drugs and medicines, and thereby effecting a modicum of standardization, they have evolved into compendia that set forth, with the authority of government, specific requirements for strength, quality and purity of drugs and their official preparations. These specifications are called "standards".

According to Webster, the word "standard" has a variety of meanings. It is both a noun and an adjective. It has many uses, but there are three particular meanings that I want to bring to your attention now. It is "a figure adopted as an emblem by a people, as the eagle was the standard of a Roman legion, or the personal banner of the ruler of a state". Again, it is "that which is set up and established by authority as a rule for the measure of quantity, weight, extent, value or quality". Furthermore, it is "that which is established by authority, custom, or general consent

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\* An address delivered upon the occasion of the presentation of the charter to the Alpha Omicron Chapter of Rho Chi, University of Pittsburgh, November 21, 1950.

as a model or example, as a criterion or test." Hence "standard" refers both to the units with which others are compared and to the procedures involved in making the comparison.

The principal consideration in adopting a standard is the use to which the standardized article is to be put. As a reference standard for drugs, it is that with which comparisons are made, either the purity must approach unity as closely as possible, or the content of active or reactive ingredient must be known with high precision. For a standard reagent, purity is a matter of highest importance. In a standardized drug or medicinal preparation deleterious substances must be absent, and the content of therapeutic ingredient must not vary beyond limits that will prevent properly regulated dosage.

Standards are of a relatively tangible character, and in particular are reproducible. Some of these tangible standards are in fact arbitrary. Such, for instance, is the meter as a unit of length. Originally defined as one ten-millionth of the distance from the equator to the pole, measured on the meridian passing through Paris, it is now based upon things capable of precise measurement such as the length of a particular pendulum or a certain wave length of red light. Actually, however, because of the complications of making these measurements for comparison purposes, the meter upon which we depend is simply the distance between two marks on a bar of platinum that is preserved in Paris. This is the prototype meter, and whatever error was made in establishing these marks is perpetuated in the copies that have been deposited in various capitals for their use, and in all measurements based thereon. Similarly, the liter, which was intended to be one thousandth of a cubic meter, is actually based upon the volume of 1 Kilogram of water determined under specified conditions, so that a liter differs from a cubic decimeter by 64 millionths of a unit. Therefore, to all intents and purposes the same thing, for legal exactness we must say that when in the U.S.P. we refer to a cubic centimeter we actually mean not that but the thousandth part of a liter. So, even in tangible standards we recognize tolerances.

To facilitate various procedures in chemical and biological assaying the office of the U.S.P. provides what are known as U.S.P. Reference Standards for use as the base line in a particular

assay. The only assurance we have of the accuracy of these standards is the fact that a number of specialists have by test determined that they actually meet these requirements, and our confidence in the specialists and the methods they have used.

Analytical chemists may refine to what they consider a proper degree of purity the reagents they use, or they may buy from a manufacturer reagents prepared by him to meet certain specifications, their guarantee being their confidence in the label of the manufacturer. The measuring apparatus used by an American scientist may be submitted to the U.S. Bureau of Standards, and, if it meets certain gross specifications in construction, will be submitted to critical testing for purpose of calibration; if these critical requirements are then met, a certificate of calibration will be issued and, in certain cases, a seal stamped on the article.

Throughout grammar school and high school students are constantly tested by observation and by examination, and promotion is based upon certain attainment, that is, upon some one's idea as to the sufficiency of that attainment. The criterion of accomplishment, the examination, is merely the assemblage of some persons's ideas as to what these accomplishments should be, although we assume that these ideas are based upon experience.

A certificate for college entrance states that the person in question had such and such a rank in his class. The college, in turn, states that it will not accept as matriculants students whose academic standing is below a certain quartile. He must attend a required number of class exercises in a certain number of required subjects, complete not less than a certain number of experiments with a certain specified precision and, after again demonstrating that he knows what other people think he should know, he is certified, given a diploma, and then is eligible for a professional examination by an examining board having fixed and frequently antiquated ideas regarding his education and that of his teachers, after which he may hunt for a job.

From the dawn of history there has been a desire among learned men for the companionship of one another. Their respect for each other led to the bestowal of such titles as master and doctor, the doctor being a learned man while the physician was a leech and the surgeon a barber. Thus grew the universities, where learned men kept companionship and disciples came to sit

at their feet. So also were formed the academies, more casual than the monastic groups that were the first universities. Probably the only analogy to the establishment of the universities was the establishment of chivalry, the one to mark the learned man, the other to mark the gentle man.

The professional man or woman, the product of the university, is encouraged to strive for achievement by the example and the inspiration of others who have preceded him, setting standards of conduct worthy of the professional name. The code, or standard of conduct, more than anything else distinguishes the professional man from the tradesman. Codes are more than arrangements of words into sentences; they are an expression in actual living of the aims and aspirations of a group of companions who have devoted themselves through ages to a certain task for the welfare of mankind.

One of the greatest privileges in education is that of election by one's fellows to a society devoted to recognition of scholarly attainments. The Society of Phi Beta Kappa, the oldest of the Greek letter societies, originally social, now bestows the accolade on those who surpass in scholarship in the liberal arts and the humanities. Of substantially equal significance, although younger, are Sigma Xi in scientific research and Tau Beta Pi among the engineers. Recognizing standing in the more specific disciplines are Phi Lambda Upsilon in Chemistry, Omicron Nu in Home Economics, Eta Kappa Nu in Electrical Engineering, and many others, similar in purpose, for the other disciplines that constitute professional education.

Election to an honor society is a certification equivalent to the seal of the Bureau of Standards on a volumetric flask. It is a token that should bring sober satisfaction, it is not the occasion for self praise. Honor societies are not mutual admiration societies. The quip "as rare as a double-breasted coat on a member of Phi Beta Kappa" is not an honorable commentary on the significance of scholarship. It does not become a newly elected member to become hypercritical upon the next occasion for the election of members.

A particularly significant thing regarding election to an honor society is that chapter charters are not lightly given. Possession of a charter means that the institution itself has been the subject



of critical scrutiny, that it has received the seal of approval upon its educational achievements, and that it, as well as its sons and daughters, are believed capable of professional service in exemplary fashion. This occasion, the presentation of the charter for a new chapter of Rho Chi, with its accompanying initiation of charter members, is one when our school and our students are equally complimented.

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## Pharmaceutical Administration\*

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We most heartily endorse the recommendations of The Survey in the field of pharmaceutical administration. We believe this field to be of primary importance to all students who contemplate a career not only in retail pharmacy, but in any other branch. Certainly the fundamental principles of general economics, accounting, general business law, and pharmaceutical law are just about as essential to the hospital pharmacist, the wholesale pharmacist, or the detail man as they are to the retailer. We believe the elective course in business law suggested by The Survey to be just as necessary as any of the required courses and do include it in our program, which consists of 17 semester hours or 272 clock hours. We believe in view of modern pharmacy this program needs no defense. I might add at this point that we believe the total number of hours suggested by The Survey for the complete curriculum is too high but we believe they should be reduced in certain of the other fields.

Our chief difficulty is not in giving the required courses but in meeting the condition offered by another source that this field be departmentalized with a full time professor in charge. We have not been able to find any one man who can effectively teach

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\* Read before the Conference of Teachers of Pharmaceutical Economics at the 1959 Atlantic City meeting.

all the subjects listed in this field and we hold little hope of being able to do so in the foreseeable future. Although the recommended courses are undoubtedly all related to a single field, they are too widely diversified in content and interpretation to find any one man able to do a good teaching job in all of them. Pharmacy management, for example, needs a man with good practical retail pharmacy experience. Such a man however is seldom a specialist in general economics or pharmaceutical law. He may not even be sufficiently expert to teach accounting.

We have found it necessary to use a group of four part time instructors, each a specialist in his own particular field. We still need an instructor to manage our model pharmacy which we believe to be a necessary part of the program. The actual store management is our most difficult problem with large classes. We have found that sections cannot be larger than eight students for effective work. With a class of 80 this means ten sections each of which ought to have at least 16 periods of 2 hours a week. The best that we can do at the present time is to encourage one of our present instructors in pharmacy, who has had some retail experience, to supplement his training with courses in economics and business law so that he can eventually transfer completely to this field.

In conclusion then, let me say that we do believe the courses recommended are sound, but we have been by necessity forced to split them among a group of four men, none of whom has a sufficiently broad training in all of the branches to act as a department head. We do urge pharmaceutical administrators to encourage graduate work in this field to provide the necessary manpower to carry out the proposed regulations. Until this can be accomplished, we urge that these regulations be held in abeyance.

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## Toxicology Education in the Accredited Colleges of Pharmacy of the United States

**BRENTON RICE, B.S. and CHARLES H. HINE, M.D., Ph.D., College of  
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During the past thirty to forty years pharmacy has made great advances in many new and old fields. One of these, toxicology, is probably as old as pharmacy itself. The toxic action of drugs as well as proper doses to administer has been a part of pharmacy, if only an empirical science, for many years. On many occasions the pharmacist is called upon to suggest first-aid treatment in acute accidental poisonings or to render an opinion as to the proper antidoting procedures in therapeutic mishaps. A thorough understanding of the particular toxic action produced by injudicious use of therapeutic agents or by individual susceptibility to these compounds, is a necessary part of the pharmacist's training. Familiarity with toxicity control methods used in the preparation of the products which he dispenses gives the pharmacist confidence as to their purity and safety. An understanding of the mechanism of action of the toxic effects of therapeutic compounds enhances his understanding of their therapeutic effectiveness. Hence, it would appear that this subject is, indeed, very important to the practice of pharmacy. Advances in this field, notably relating to pharmacology, have made it even more imperative for the pharmacist to take an active interest in toxicology.

Since toxicology appears to be a valuable adjunct to the practicing pharmacist, we became interested in making a survey to determine the extent to which this subject is taught in the accredited pharmacy schools of the United States and what importance is attached to its position in the curriculum. Therefore, questionnaires were sent to the sixty-six accredited pharmacy colleges of the United States which contained nine questions relating to the teaching of toxicology. Of the sixty-six letters sent, fifty-two replies

were received, a return of 78.8%. We consider this to be a satisfactory response and believe that we may justifiably draw certain conclusions from these replies.

The questionnaire was so worded as to bring out the following information: whether there is a department of pharmacology in the school and if so, is a course, or courses of toxicology included in that department; whether toxicology is required for graduation and in what year the course or courses are given; the nature of the laboratory work, whether experimental with animals or of a chemical nature; the amount of time devoted to lecture and to the laboratory; whether the lectures are given principally by a member of the faculty or by guest speakers from various outside sources, such as government agencies, invited to address the classes; and whether toxicology is considered a vital part of the pharmacist's education which will be an asset to him in the practicing of his profession.

All answers to the questionnaire were studied, tabulated, and analyzed and the following summary and conclusions present the result of the study.

#### *Summary and Conclusions*

1. A questionnaire concerning the teaching of toxicology was sent to the 66 accredited colleges of Pharmacy in the United States. Replies were received from 52 of these (78.8%).
2. All but one of the accredited pharmacy colleges replying to this questionnaire indicated that they have pharmacology departments or offer some type of instruction in pharmacology and toxicology. The majority (73.1%) have a regular department of pharmacology while in only 26.9% is instruction received in other departments or courses.
3. Toxicology instruction is chiefly offered in pharmacology courses which include toxicology. However, 46.8% of the Colleges of Pharmacy offer a separate course or courses in toxicology.
4. Schools offering separate instruction in toxicology may offer as many as three such courses while schools offering pharmacology and toxicology combined may offer up to four courses. In either instance the majority of schools offer but one course.
5. In the majority of Colleges both toxicology and pharmacology courses are required. There were more schools requiring pharmacology (18) than toxicology (11).
6. The majority of the toxicology and pharmacology courses are given in the senior year (58.5%). No schools reported offering any course in the sophomore year.

7. The tabulations show a wide range in the hours of instruction. In toxicology the range is 15-144 for lecture; 30-96 for laboratory, in those schools offering these extra facilities. The average was, Lecture, 55.1; Laboratory 63.5.
8. Laboratory instruction was approximately equally divided between schools giving animal and chemical experiments (equal percentages in both cases) with a smaller number offering both types of laboratory work.
9. Over three quarters of the schools prefer to have only their own staff lecture. A smaller number have guest lecturers in addition to the staff lecturers.
10. The opinion was generally expressed that training in toxicology was a vital part of the pharmacy student's education.

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## Organic Medicinal Products\*

### **What Should Be the Proper Balance and/or Correlation Between the Chemistry and the Pharmacology?**

**E. E. LEUALLEN**

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Within recent years we have been hearing a great deal about the presentation to the students of comprehensive information concerning organic medicinal products. Various speakers and writers have discussed the desirability of considering both official and non-official products in a formal course which should be undertaken by the student after he has been properly trained in certain fundamental sciences. We have heard such titles as "The Chemistry of Organic Medicinal Products," "The Pharmacy and Chemistry of Medicinal Products," "New and Non-Official Remedies," etc., applied to this course.

It is not the purpose of this introduction to attempt to describe the points of difference between these various courses. Furthermore, it is recognized that a certain degree of difference is

\* Read before the Conference of Teachers of Chemistry at the 1950 Atlantic City meeting.

healthy as indicative of the interests of the individual instructor and the personality of the institution. It is necessary, however, that we do define somewhat carefully the course which forms the background of our present discussion. Having established the objectives of the course, we can then determine to what extent pharmacology comes into the picture.

Courses given under titles of the type mentioned fall into two categories, similar in many respects, but differing in at least one very important aspect of the over-all objective.

There is, first, the course as it is offered in the junior year, immediately following a course in organic chemistry and preceding a course in pharmacology. This course, based on a chemical classification of products, is a logical follow-up on the fundamental training received in organic chemistry. Physiology has been covered and, perhaps, has included an introduction to physiological chemistry.

Several desirable goals may be achieved through the course in Organic Medicinal Products, as given under these circumstances. The adaptation of familiar reactions and syntheses to the preparation of medicinal agents brings this information into the field in which the pharmacy student has most interest. In discussing classes of compounds and specific examples, the effect of structural modifications on physical and chemical properties can be illustrated and the correlation of structure and physiological activity can be discussed wherever sufficient data is available.

To some extent, pharmaceutical uses may be discussed and the relation of physical and chemical properties to these uses may be explained. An extensive coverage of pharmaceutical uses is undesirable as it probably represents a duplication of subject matter given elsewhere. Certainly no more than brief mention of pharmacological action and therapeutic use should be made since the student has not yet received instruction in pharmacology.

This course, therefore, elaborates on fundamental physical and chemical principles and illustrates their application to the constitution, preparation and behavior of medicinal agents. There can be little correlation between chemistry and pharmacology inasmuch as the student is not yet on speaking terms with the latter subject.

Of considerably broader scope is the course, Organic Medicinal Products, as it is given in the senior year either following or



concurrently with the course in pharmacology. Here, not only may the goals of the junior year course be realized but, in addition, a summation and correlation of all factors concerned with the use of remedial products may be undertaken. Such a course has been characterized<sup>1</sup> as a capstone in the training of the pharmacist and this it may well be, particularly if organized and operated in proper relation to Dispensing Pharmacy, the other culmination course of the senior year.

Greatest value can be derived from a course of this type when it follows the course in pharmacology. *Organic Medicinal Products* then functions as a coordinating center, with opportunity to discuss the pharmaceutically important features of each topic whether it be in the field of chemistry, pharmacy or therapeutics. As a matter of fact, occasions will arise when legal and economic sides of the picture come logically into the discussion.

The student entering this course is familiar with the medicinal uses and pharmacological actions of the drugs to be discussed; it is a proper time to direct his attention to the relation of structure to this activity. The language of pharmacology must be used in a discussion of this sort and, certainly, mention will be made of therapeutic applications but, it will be noted, no attempt is being made to teach pharmacology. We are simply using a part of the subject matter of pharmacology which is already familiar to the student as a building stone in the structure of this summation course.

In covering local anesthetics, for example, it is probable that the course in pharmacology has included such topics as the historical background, classification, means of evaluation, mechanism of action, definition of terms, therapeutic uses, means of use and toxicity. The names of official or otherwise important items may have been given and the underlying structure of the procaine type compound may have been illustrated.

It now remains for the course in organic medicinal products to discuss more fully the structure of the compounds and to use examples illustrative of general rules regarding the relation of structure to activity. Attention must be given to the particular application of each compound as influenced by such factors as

<sup>1</sup> Preliminary Report of the Consultative Committee of Teachers of Chemistry. The Pharmaceutical Survey, presented at the San Francisco Meeting, A.P.A., 1948.

solubility, stability, ionization, etc. Similar consideration should be given to compounding technique and incompatibility. Finally, available forms and proprietary items will close the discussion.

To summarize, it is desirable that the student be familiar with the fundamental aspects of pharmacology, including the mechanism of action and the therapeutic uses of medicinal agents before undertaking the course in organic medicinal products which may then attempt to correlate these facts with physical and chemical properties so that the student may have a more thorough understanding and appreciation of the products he will handle.

Now let us consider briefly the modification necessary when Pharmacology and Organic Medicinal Products are scheduled the same year. In this instance, a high degree of cooperation is necessary to avoid unworthy duplication of subject matter. Although repetition of certain descriptive terms may be permissible in discussions separated by several months, such repetition after an interval of only a few week or, perhaps, a few hours, is intolerable.

Assuming that a chemical classification is used as the basis for the course in organic medicinal products, there will be many groups which run through a variety of pharmacological actions. It makes little difference when these items are scheduled for discussion. A brief statement may be made concerning the therapeutic use of each.

Where the chemical classification parallels essentially the pharmacological, it is advisable that a specific group be discussed first in pharmacology. This material may then be treated in the organic medicinal products course in practically the same manner as if the fundamental pharmacology had been given the previous year.

With either plan, agreement on the part of individuals concerned, and recognition of suitable objectives for the courses of the senior year, can lead to a well-rounded understanding of pharmaceutical and medicinal agents.

## **Organic Medicinal Products\***

### **What Should Be the Proper Balance and/or Correlation Between the Chemistry and the Pharmacology?**

**BY FRED SEMENIUK**

**The University of North Carolina**

To those who are charged with the responsibility of training students at the undergraduate level to qualify them, within the scope of a prescribed curriculum, as practitioners in various phases of pharmacy, the question frequently comes to mind as to the relative qualitative and quantitative importance of the chemistry and the pharmacology of the organic medical products to which the students are exposed; the question also arises as to what extent these two phases, the chemistry and the pharmacology, may be blended.

Syllabus recommendations of recent years, evolved curricula and consensuses leave no question that balanced quantities of fundamental courses in organic chemistry and physiology should be prescribed early in the course of study. With these serving as foundation material, it is logical to follow them by individual courses in organic medicinal products and pharmacology.

There is not much room for argument as to which, organic medicinal products or pharmacology, should precede the other, chronologically. This is an unimportant consideration, assuming that fundamental courses in both organic chemistry and physiology have been obtained.

The Tentative Fifth Edition of the Pharmaceutical Syllabus (1945) gave recognition to a 32 didactic and 48 laboratory hours minimum course of the nature of organic medicinal products under the heading of "The Pharmacy of Medicinal Products II". The objective of this course, relative to this discussion, was "To apply the theoretical instruction of the courses in chemistry, physics, pharmacy, pharmacognosy and pharmacology to the utilization of organic substances as medicines". On the basis of the context

\* Read before the Conference of Teachers of Chemistry at the 1950 Atlantic City meeting.

outlining the scope of the course, the only inference, as to its pharmacological content, that can be drawn is that the intent was to consider only pharmacologically significant substances, not their pharmacology. The same edition of the Syllabus recommended, by inference, as an objective of the course in pharmacology that some mention be made of "the relationship between chemical structure and pharmacological action" at least in an introductory way.

Recently published texts in the field of organic medicinal products have affected profoundly a modern trend—that the consideration of pharmacological activities has a rightful place within the covers of a book devoted principally to the chemical and pharmaceutical aspects of organic medicinal products. Correlations between chemical structures and pharmacological actions have become in some cases so well established that many of them have reached the predictive stage.

The chemistry and pharmacology of drugs, insofar as associations between them have been established, should never be dissociated. Since any significant learning process by students is largely through the mechanism of association of ideas wherever possible, their retention of chemical and pharmacological facts regarding drugs is facilitated if they be encouraged to practice the associations. No conscientious teacher of organic medicinal chemistry can justly be jealous of a pharmacologist who places a series of related organic structural formulas on the blackboard to illustrate their shades of difference in pharmacological activity; in most cases it would be done only to the extent of the pharmacologist's self-confidence about his knowledge of structural formulas. The same should be true of the teacher of pharmacology if the organic medicinal chemistry teacher resorts to mentioning pharmacological actions to emphasize similarities or differences in chemical structures and properties. It is safe to say that most modern teachers of medicinal chemistry either have taken an organized course in pharmacology or have gained their acquaintanceship with the subject by their own reading.

The contention here is to encourage the mention of correlated pharmacological facts in the chemistry and pharmacy of organic medicinal products. To this end, the teacher should be qualified or be obligated to qualify himself. It is hoped that the Conference

of Teachers of Biological Sciences will consider fertile for discussion their view-points with respect to the inclusion of chemical structures in courses in pharmacology.

Not a great deal need be said regarding the question as to what should be the proper balance between the chemistry and the pharmacology in a course in organic medicinal products. Such a balance can be expressed satisfactorily in qualitative terms. Suffice to say that any individual decision should be based upon the constant realization that the pharmacology should be given the important supplementary role.

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## A Course in Economic Biology for Pharmacy Students\*

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As used here, the title Economic Biology refers to a course involving the study of pesticidal materials and of the pests against which they are employed.

The organizing of this course requires much careful thought and preparation, and the teacher should aim to present it in such a manner that those who register for it will have, upon its completion, a well-rounded understanding of the subject.

The ideal teacher for the course would be one who has considerable knowledge of entomology, botany, zoology, chemistry, and certain phases of agriculture. And because it is unlikely that a prospective teacher of the course will be proficient in all of these subjects, he will find it necessary to prepare himself carefully.

Literature on this subject is voluminous. In building up a teaching collection one must resort to textbooks. United States

\* Read before the Conference of Teachers of the Biological Sciences at the 1950 Atlantic City meeting.

Government publications, scientific journals, experiment station bulletins, as well as many other sources of information.

Manufacturers of ingredients and finished preparations are very cooperative. They will do their utmost to assist the teacher in building up a teaching collection of demonstration items and will furnish much valuable printed material for use by the teacher and the students.

Organizing of the course in Economic Biology at the Massachusetts College of Pharmacy was undertaken several years ago, and the course has been offered as an elective during each of the past four years. Two didactic and two laboratory hours for a single semester allow for credit of three semester hours.

During the early days of preparing for this course, a rather extensive card file of the manufacturers of pesticidal items was prepared. The current edition of *Entoma* was one of the principal sources of information. Manufacturers were selected with the idea of including those who could supply a variety of demonstration items—such as various ingredients—as well as finished preparations ready for use by the consumer. Many manufacturers have cooperated very willingly and have supplied us with a great variety of demonstration material. As items are received their names are entered on the proper cards in the file of manufacturers. By so doing we know that at all times what each contributor has supplied. At the present time we have hundreds of items available for demonstration purposes and for laboratory use.

Materials are placed on display in the laboratory, and students have the opportunity to examine and study not only the individual ingredients but also representative preparations.

By keeping in touch with new developments reported in the literature and with manufacturers' announcements received by mail, additions to our teaching collection are continually being made.

There is no one textbook that contains all of the subject matter considered in this course. Even if such a book were to be written it would be out-of-date almost before it could be completed. During the past two years, however, our students who have registered for Economic Biology have been required to supply themselves with copies of the second edition of *Destructive and Useful Insects* by Metcalf and Flint. This requirement seems justified for



several reasons. For one thing, regular study assignments are made from this book. For another, it is used during a number of laboratory periods. And it will remain as a valuable source of information for the student after graduation.

Still other sources of information must be resorted to frequently during the entire course. Much of the information is obtained by the studying of frequent library assignments. These assignments are carefully selected from text and reference books, journals and other periodicals, Federal Government publications, and State experiment station and extension service bulletins. Printed matter available from manufacturers often proves very valuable as a source of information, and should not be overlooked by the teacher or student.

It seems appropriate to mention at least some of the important publications in which study assignments are made. The second edition of Donald E. H. Frear's work entitled *Chemistry of Insecticides, Fungicides, and Herbicides* is almost indispensable as a source of much up-to-date information. A few of the other books containing subject matter of value to the student are as follows: *Economic Botany* by Albert F. Hill; *Weeds* by W. C. Muenscher; *Poisonous Plants of the United States* by W. C. Muenscher; *Weeds of Lawn and Garden* by John M. Fogg, Jr.; *Hay Fever Plants* by Roger P. Wodehouse; *College Entomology* by E. O. Essig; *Applied Entomology* by H. T. Fernald and Harold H. Shepard; *Entomology for Introductory Courses* by Robert Matheson; *Insect Pests of Farm, Garden, and Orchard*, by Leonard M. Peairs; *Chemistry and Toxicology of Insecticides* by Harold H. Shepard; and *Fungicides and Their Actions* by James G. Horsfall.

Many scientific journals and other periodicals furnish current information of value to both the teacher and student. The *Journal of Economic Entomology*, *American Journal of Public Health*, both editions of *Industrial and Engineering Chemistry*, *Economic Botany*, and *Science* are a few which should be mentioned. Almost every issue of the relatively new monthly publication known as *Agricultural Chemicals* contains information of value. This periodical should always be available to students interested in pesticides. In addition we should point to the magazines *Soap and Sanitary Chemicals*, *Pests*, and *Drug and Cosmetic Industry* as being well worth consulting.

House organs, such as the *DuPont Magazine* and the *Rohm and Haas Reporter*, often contain useful material. There is almost no limit to the number of valuable publications available from Federal and State agencies.

*Entoma*, mentioned earlier in this paper, is a directory of pest control materials published by the Eastern Branch of the American Association of Economic Entomologists. Now in its eighth edition, it will prove invaluable to anyone connected with a course in this subject.

The teacher will quickly accumulate an extensive collection of special technical and commercial literature, and every effort should be made to keep such a collection up-to-date. Bulletins and other sources of information pertaining to the subject matter being considered are always displayed with the appropriate demonstration items in our teaching collection.

Each student is supplied with a carefully selected set of bulletins and other forms of printed matter during the progress of the course. In the absence of a satisfactory textbook, and because the time for presenting the subject matter is limited, it is felt that these sources of information are extremely important. Each student is also supplied with one or more file boxes in which bulletins are kept together. Publications for the students' sets are selected from the many available from the Superintendent of Documents, Washington, D. C., State experiment stations and extension services, manufacturers, et cetera. Those registered in our course are advised to retain this set for use as reference material at a later time, and to make an effort to add to it as new information becomes available.

As far as the didactic portion of the work is concerned, more time is spent on the consideration of insects and related organisms, and substances used in their control, then on any other group of pests and pesticides. A brief review of the various classes of arthropods is presented, special emphasis being placed on the class *Insecta*. Structural characteristics of the various organisms are considered, as are types and extent of damage, feeding habits, and metamorphosis. For convenience, as much as we can, we divide insecticides into three groups as follows: (1) Those of plant origin; (2) Inorganic chemicals; and (3) Organic synthetics.

Other pests and pesticidal materials considered include rodents and rodenticides, weeds and herbicides, and certain fungi and fungicidal materials. Some time is also spent on selected plants which are harmful to man and other animals.

In presenting work on the various pesticides obtained from or consisting of plant parts, some consideration is given to the plants that yield them. Methods of production are briefly discussed in certain cases. For all the pesticides, some information concerning their physical and chemical properties is presented, as are certain historical data. General and specific uses, type of preparations available, methods of use, and precautions to be taken by the user are given in greater detail. Where it seems necessary, information concerning symptoms of poisoning and methods of treatment are included.

A brief consideration is given to adjuvants, such as diluents, solvents, wetting and emulsifying agents, and synergists.

Regular study assignments are made, not only in the required textbook, but also in various bulletins in the student sets, as well as in publications available in our library. In view of the great amount of subject matter to be covered, this practice is essential.

Students are taken on field trips as many times as possible in the early part of the course. During these periods the members of the class are instructed in methods of applying certain pesticidal sprays and dusts, and sometimes they actually carry out the procedures themselves. The actions of some herbicides are demonstrated. In so far as possible the students are familiarized with certain destructive insects and fungi, as well as with the damage they cause. Certain weeds and otherwise harmful species of plants are observed.

There seems to be almost no limit to work that can be carried on in the laboratory. As a means of reviewing insect structure the members of the class study the external features of the grasshopper and other selected species. Particular emphasis is placed upon mouth parts.

Various destructive insects and other arthropods are studied, and the students are required to prepare labeled drawings and to record certain information concerning types of damage caused methods of control, et cetera.

Simple methods of testing insecticides are carried out by the students themselves. Live American cockroaches and adult houseflies are the insects usually used in this part of the work.

To demonstrate the actions of rodenticidal materials, white and brown rats are fed various poisons. During these experiments the students can observe the symptoms following the ingestion of the various poisons. Careful records of the results are kept by the members of the class.

Some of the other laboratory work includes the studying of crude insecticidal materials of plant origin, preserved and herbarium specimens of selected poisonous plants and weeds, and the carrying out of seed germination tests to illustrate the actions of seed-treating fungicides. Selected motion pictures have been used a number of times.

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In this paper an attempt has been made to discuss the author's experience in organizing and presenting a course dealing with economic poisons. Because of the limited time available it has been necessary to omit many details. In the opinion of the writer the subject matter of such a course can be expanded or condensed to suit the program of a particular school.

Student response and interest in this work over a period of four years have been excellent, and it seems that there is a definite place for such a course in the college of pharmacy curriculum.

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The editorial office has received from the **American Dental Association** a substantial list of literature references to subjects pertaining to dental therapeutics. The references have been accumulated during the last two years for the use of the Council on Dental Therapeutics and naturally most of them deal with the application of the use of the most modern drugs to dental therapy. It is planned to prepare a cumulative list every six months. We believe this list of references to be of great value to pharmaceutical educators and practicing pharmacists. It may be had for the asking by addressing the American Dental Association at 222 East Superior Street, Chicago 11, Illinois.

## Mathematics of U.S.P. XIV Bioassays\*

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Bioassays were first officially recognized in USP IX, published as a result of the 1910 U.S.P. Revision Convention. It was decided to incorporate in part 2 of the book the dog method for cannabis; the lethal dose method for aconite; the 1-hour frog method for digitalis, strophanthus and squill; the dog pressor method for products of the suprarenal gland; and the isolated guinea pig uterus method for pituitary extract. Methods set forth in the USP IX were simple, readily understandable, and no attempt made to determine the precision of the results obtained. In general the methods relied on a so-called "animal unit" and there were no reference standards available for bioassay comparison.

USP X which became official in 1926 recognized these methods of bioassay, also adding procedures for capsicum, ergot and vitamin A; revisions added assays for vitamin D and cod liver oil. Simultaneously NF V required bioassays for fluid extracts of aconite, apocynum and digitalis using the USP X methods. USP XI extended the scope of these methods somewhat, although the bioassay for cannabis was deleted. Liver extracts and stomach were assayed on humans for anti-pernicious anemia activity. Again the procedures were reasonably simple; refinements of technic began to appear, and methods of computation were usually readily understandable. Relatively few changes were made in bioassay procedures in USP XII and NF VII; however the appearance of USP XIII and NF VIII indicated the effect of statistical work not only in this country but in England. Attempts were made to outline more and more specific factors which would limit the variability, also attempts were now made to introduce methods of calculation to determine the precision of any assay results obtained.

\* Read before the Conference of Teachers of the Biological Sciences at the 1950 Atlantic City meeting.

The authors wish to express their appreciation for the help given by A. B. Sloane, Munch Research Laboratories, Inc., 306 So. 69th Street, Upper Darby, Pa., for his assistance in applying routine commercial bioassay information to the solving of the sample problems reported in this paper.

The appearance of the page proof of USP XIV has led to a further consideration of bioassay procedures: one is at once impressed with the fact that he is in new territory because the present methods of bioassay appear to bristle with statistics, at least on the first glance. This represents a definite advance, statistically, in the design of experiments. Every experiment is now set up to carry its own control, to determine the nature of the response of the unknown and of the reference standard, to determine the precision of the results obtained in these final assay technics. In order that students may understand the importance of these procedures, and recognize the reasons for the improved design of these experiments, this paper has been prepared. It is assumed that a student has a working knowledge of arithmetic, knows how to use a slide rule and a calculating machine (or an adding machine) and has at least a working knowledge of the use of logarithmic tables. No attempt is made to follow through the derivation of the complicated formulae, which may get into fields of calculus or higher mathematics not readily mastered by the usual pharmacy student. The standard text books in the field of statistics usually indicate the types of procedure that have been followed. The present trend toward improved design of statistics is closely associated with a number of papers by Chester I. Bliss and associates, among others.

It is noted that a number of tests have been introduced in the USP XIV which in a sense are "safety tests" or "identity tests". Typical of the safety tests would be the procedures for meeting the requirements of the National Institute of Health for a large number of *biological preparations*. Typical of the identity tests would be the pigeon emesis method for *digitoxin* (USP XIV, page 180) and *digoxin* (USP XIV, page 184).

#### *Digitalis Group*

From tests on frogs and on cats, USP XIV has shifted emphasis to the use of pigeons, which receive intravenous injections of dilutions of the material so prepared that death should follow after approximately fifteen injections at 5-minute intervals. Not less than 6 pigeons are used on the reference standard tincture and not less than 6 pigeons are used on the unknown preparation as tincture. An example of this method, with the details of calculations are reported in Table I.



TABLE I

## DIGITALIS ASSAY

Standard Dilution 5.5%

Pigeon	Weight	Doses
1	230	14
2	290	14
3	310	14
4	345	15
5	295	15
6	300	16

Ave.

$$14.6 = \bar{Y}_s$$

Unknown Dilution 5.5%

7	285	13
8	290	14
9	310	16
10	325	15
11	310	16
12	300	15

Ave.

$$14.8 = \bar{Y}_u$$

$$\bar{Y}_s \times \text{dil. Std.} = 14.6 \times 5.5 = 0.986 \text{ Digitalis Unit/cc}$$

$$\bar{Y}_u \times \text{dil. Unk.} = 14.8 \times 5.5$$

$$\text{s.e. of Potency} = \sqrt{g_s(R_s/\bar{Y}_s)^2 + g_u(R_u/\bar{Y}_u)^2} = \sqrt{0.026(2/14.6)^2 + 0.026(3/14.8)^2} = \pm 0.039$$

$$\text{Potency} = 0.986 \pm 0.039 \text{ Digitalis Unit/cc}$$

Pigeons 1 through 6 were given 14 to 16 doses of the standard tincture of *digitalis*, diluted to represent a 5.5% solution (to make this test solution for intravenous injection, 5.5 cc of the tincture of standard digitalis are diluted to 100 cc with isotonic sodium chloride solution (U.S.P. XIV, page 179)). A similar dilution is made with the unknown sample, making the original assumption that it is of the same potency as the reference standard: based on the data obtained, a second and perhaps more proper dilution can subsequently be prepared. In Table I it is noted that the average number of doses required for the first 6 pigeons, receiving the standard, was 14.6 doses. Similarly pigeons 7 through 12 received from 13 to 16 doses, averaging 14.8 doses in this series. Inspection shows at once that the material is somewhat weaker than the reference standard.

The potency is determined by the fraction:

$$\frac{\bar{Y}_s \times \text{cc standard in 100 cc dilution}}{\bar{Y}_u \times \text{cc unknown in 100 cc dilution}}$$

Here potency would equal

$$\frac{14.6 \times 5.5}{14.8 \times 5.5} = 0.986 \text{ digitalis units/cc of tincture.}$$

This has the advantage over previous methods of computation, in that the unitage of the unknown material is read directly in terms of digitalis units.

The method of calculating the standard error of the assay is indicated on page 180. The formula is

$$\text{s.e. of assay} = \sqrt{g_s \frac{f(R_s)]^2}{l(\bar{Y})_s]}} + g_u \frac{f(R_u)]^2}{l(\bar{Y})_u]}$$

The value of the factor "g<sub>s</sub>" is given in the Pharmacopeia, and is determined by the number of pigeons actually used on the standard digitalis material; the factor "g<sub>u</sub>" is the same type of factor for the actual number of pigeons used on the unknown sample. In general g<sub>s</sub> and g<sub>u</sub> should be the same, although they do not have to be. The quantity "R<sub>s</sub>" designates the range of doses administered to the pigeons receiving the standard; it is obtained by subtracting the smallest dose which produces death from the largest dose which produces death. For a satisfactory assay this value must never exceed 4; if it does the data are considered to be preliminary, and additional pigeons are used in a new test. Similarly the quantity "R<sub>u</sub>" represents the range of doses between the maximum and the minimum number for the pigeons receiving the unknown product.

The quantity " $\bar{Y}_s$ " represents the average or mean number of doses of the standard required to produce death and " $\bar{Y}_u$ " designates the number of doses of the unknown. Stripped of mathematical approaches, this really says then that one should divide the range between the smallest and largest doses producing death by the mean number of doses required and square it, then multiply it by a factor corresponding to the number of pigeons on which the mean is based. The sum of these two products gives a total value of which the square root is the standard error of the

potency value. Referring now to the data in Table I

$$\text{s.e. of assay} = \sqrt{0.026 \left[ \frac{2}{14.6} \right]^2 + 0.026 \left[ \frac{3}{14.8} \right]^2} = \pm 0.039$$

The potency is  $0.986 \pm 0.039$  digitalis units/cc.

Multiplying this by 100 we obtain the potency as  $98.6 \pm 3.9\%$  of the reference standard product.

This same method is used for the bioassay of various preparations of digitalis, of *lantoside C* (314), and of *Ouabain* (410).

This method is somewhat simpler than that for computing the results of the cat assay of digitalis USP XIII: the particular beauty is the development of the factor for "g", that is, for the number of pigeons used for the assay of either sample. By preparing a proper form, students should be able to assay a sample of digitalis on pigeons and get the results rather promptly and without recourse to computing instruments, other than slide rules.

#### *Epinephrine Solutions (page 214)*

*Epinephrine solution* is diluted and injected into the femoral vein of an anesthetized dog, alternately administering dilutions of the reference standard and of the unknown preparations. In USP XIII a total of 5 doses might be adequate; for complete conformity with the requirements of the USP XIV, it would seem that not less than 17 doses are required in order to reach an opinion regarding the pressor potency of the unknown sample compared with that of USP reference standards epinephrine.

Trial doses between 0.5 cc and 1.5 cc of the reference standard solution are given to produce a rise in blood pressure in the dog of not less than 30 mm and not more than 60 mm Hg. Once this level of dosage has been established it is injected alternately with varying doses of the unknown solution: the standard solution volume is usually unchanged during the course of any given assay.

Data of a typical assay of epinephrine by the USP XIV method on the dog are given in Table II. The first 4 doses were entirely spotting doses to determine the quantity of standard required and therefore are not incorporated in this table. The selected dose of standard was found to be 0.6 cc of the dilution used: the logarithm of this dose is the quantity  $9.7782 - 10$ , shown in the second column of the table under the head  $S x_s$ .

TABLE II  
Ephinephrine Solution Assay

Dose #	S $X_s$	U $X_u$	Obs.	Interp- olated $Y_s$	U $Y_u$	$(Y_s - Y_u)$	$(X_s - X_u)$
5	9.7782-10		42				
6		9.6812-10		41.5	36	5.5	0.0970
7	9.7782-10		41				
8		9.8573-10		42	51	-9	-0.0791
9	9.7782-10		43				
10		9.7782-10		42.5	44	-1.5	
11	9.7782-10		42				
12		9.7782-10		41	43	-2.0	
13	9.7782-10		40				
14		9.8573-10		40	50	-10	-0.0791
15	9.7782-10		40				
16		9.6812-10		42	34	8.0	0.0970
17	9.7782-10		44				

The third column headed  $U X_u$  contains the logarithms of the unknown dilutions which were injected alternately with the uniform dose of the reference standard. It may be noted that 2 of these doses at random are smaller; 2 are identical; and 2 are larger than the quantity represented by the volume of the reference standard solution. The smaller dose is approximately 80% of that of the standard and the larger approximately 120% of the volume of the standard.

The entries in the fourth column under the heading "Obs" represent the actual values in mm Hg: for example dose 5 produced an increase of 42 mm and dose 7 of 41 mm, averaging 41.5 mm which is shown in the following column headed  $Y_s$ . The response in mm of Hg produced by the test dose of unknown in dose 6 was 36 mm, as listed under the heading  $Y_u$ . The seventh column  $(Y_s - Y_u)$  represents the difference between the mean value for the two doses of standard and the intervening dose of the unknown: in this case 41.5 mm from the standard and 36 from the unknown present a difference of 5.5 mm. Finally, the value in the last column headed  $(X_s - X_u)$  represents the difference between the dose of standard in dose 5 and of the unknown in dose 6. The sign of this dose is maintained. By following through in this order, a total of six values for the quantity  $(X_s - X_u)$  were obtained.

Attention is now directed to the second portion of Table II (Table II-A).  $N$  represents the number of doses of unknown; in this case 6 doses.  $S(X)$  is the summation of the values of  $X$  or 0.0358.  $S(X^2)$  is the summation of  $X^2$  or 0.0313. Other calculated values follow.

TABLE II-A

(1) $N$	= No. of doses of U	6.
(2) $S(X)$	= Sum of $X$	0.0358
(3) $\bar{X}$	= $S(X)/N$	0.00597
(4) $S(Y)$	= Sum of $Y$	-9.0
(5) $\bar{Y}$	= $S(Y)/N$	-1.5
(6) $S(X^2)$	= Sum of $X^2$	0.0313
(7) $[X^2]$	= $S(X^2) - \bar{X} S(X)$	0.0311
(8) $S(Y^2)$	= Sum of $Y^2$	281.5
(9) $[Y^2]$	= $S(Y^2) - \bar{Y} S(Y)$	268.0
(10) $S(XY)$	= Sum of $XY$	2.8124
(11) $[XY]$	= $S(XY) - \bar{X} S(Y)$	2.8661
(12) $b$	= $[XY]/[X^2]$	92.159
(13) $M$	= $\bar{X} - \bar{Y}$ $\bar{b}$	0.0222 or 1.052 mg/cc
(14) Reduced $[Y^2]$	= $[Y^2] - b [XY]$	3.863
(15) $S^2$	= Reduced $[Y^2] / N-2$	0.9658
(16) $b^2$	=	8493.2813
(17) $S^2/b^2$	=	0.0001137
(18) $b [XY]$	=	264.1369
(19) $\bar{Y}^2$	=	2.25
(20) $V(X)$	= $S^2 \left( \frac{\bar{Y}^2}{b^2 [b^2 [XY] + N]} + \frac{1}{N} \right)$	0.0000199
(21) $SM$	= $\sqrt{V(X)}$	$\pm 0.0044$
(22) Std. Error of Pot.	= $2.3S_m$ (antilog $M$ )	$\pm 0.0106$
(23) CV	=	1.01

The value for "b" represents the slope, that is the rate of change in value  $X$  with value  $Y$ .  $M$  represents the antilogarithm of the potency. The value  $S_m$  is the square root of the variance and represents the standard error of the mean value; the standard error of the potency in this sample was  $\pm 0.0106$ . The potency of the unknown was found to be 1.052 mg/cc. The coefficient of variation is 1.01; this indicates a very precise assay.

By setting up blank forms for all of these entries, the mathematics involved is comparatively simple: a table of logarithms is required as well as a slide rule. Sloane has developed this set of tabulations and "Parameters" which represent the specific values that must be obtained to reach a proper answer. If a comptometer or other calculating machine is available then entries 16 through 19 also facilitate computations, although they are not called for in the draft of the USP.

The underlying mathematics was worked out by Burt Vos. In reading the text of USP XIV, especially page 216, it seems to bristle with complicated mathematics; however, by determining each value in order, much of the apparent confusion disappears and the reason for the calculations become rather simple as well as obvious.

By reference to the monographs for *Oxytocin*, page 416, and for *Vasopressin*, page 657, it may be noted that the same method of assay is required, namely pressor response on the dog; the reference standard is posterior pituitary extract. For *Oxytocin*, the pressor test appears to be a "limit test": that is, pressor activity does not exceed 0.5 USP pituitary units/cc; although not specifically stated, the presence of a greater amount of pressor activity would probably indicate that the *Oxytocin* was unsatisfactory.

Similarly in the assay of *Vasopressin* on page 658, reference is made to comparison of pressor activity against that of the standard solution of posterior pituitary on the dog using the epinephrine technic. Potency is calculated in the same way as that for epinephrine but expressed as pressor potency in terms of USP posterior pituitary units/cc and the standard requires its pressor potency is not less than 17 nor more than 24 post pituitary units/cc. The method of calculation of standard error, etc., are identical with those in the epinephrine assay. The assay is satisfactory if the standard error is less than 1.4 USP pituitary units.

Curiously, a similar design of assay is suggested for *posterior pituitary extract*, page 476, in which blood pressure is determined on a young adult domestic chicken: injections are made into wing vein and the potency of an unknown compared with that of the solution of reference pituitary powder. The technic is measurement of the fall in blood pressure, which may be called the de-



pressor potency; methods of administration, the design of the study and interpretation of results are identical with those of the epinephrine dog pressor assay.

Referring to the USP monograph, the oxytocic effect of *Oxytocin solution* is measured by the depressor response of the chicken, using the same pattern as for the dog epinephrine assay, and complying with the standard that each cc of Oxytocin Injection has an oxytocic activity equivalent to 10 USP posterior pituitary units.

#### *Posterior Pituitary Solution*

This is bioassayed on the isolated guinea pig uterus, using the method of USP XIII. Here alternate doses of standard and of the *Posterior Pituitary* preparation under test are given until a series of four contractions of approximately the same height are obtained; a fifth dose which is 125% of the dilution produces a response oxytocic in nature and definitely greater than the previous four. The two contractions of the standard are considered as sub-maximal if the difference between the lowest of them and the definitely increased dosage standard is greater than twice the difference between response to the two equal doses of standard. Knowing the quantity of unknown and of reference standard employed, it is simple to compute the oxytocic potency by direct proportions: it should be not more than 1 USP unit/cc of injection.

This assay of oxytocic effect, curiously, is determined only for the *vaso-pressin injection solution*, and is not used for measuring oxytocic action of either *oxytocin* or *posterior pituitary* solutions.

#### *Testosterone Propionate Injections*

USP XIV, page 609

This product is tested by the same type of method used in the bioassay of penicillin and other antibiotics. It consists in preparing two dilutions, known as a high and a low dilution of the standard; and likewise two dilutions of the unknown. A series of male rats are castrated and allowed to recover for a period of two weeks; groups of ten receive the high and the low doses of the standard; other groups of not less than ten each receive the large doses and the small doses of the unknown *testosterone* making a total of not less than forty rats in any given assay. Approxi-

mately 72 hours after the injection of the 0.1 cc of test solution, rats are sacrificed and the weights of these are determined to 0.5 mg.

TABLE III

## Testosterone Propionate

R	7 $\overline{U_h}$	6 $\overline{U_l}$	5 $\overline{S_h}$	6 $\overline{S_l}$	SR = 24
	26	12	22	13	
	24	11	24	10	
	22	10	21	12	
	19	13	23	11	
	21	15	22	12	
	23	9	19	14	
	24	12	23	15	
	25	11	24	10	
	22	11	22	9	
	20	10	21	12	
	226	114	221	118	

$$V = U_h - S_h + U_l - S_l = 226 - 221 + 114 - 118 = 1$$

$$W = U_h + S_h - U_l - S_l = 226 + 221 - 114 - 118 = 215$$

$$P = \text{Antilog. } iV/W = 0.3010 \times 1 = 0.0014 \text{ or } 100.3\%$$

$$\begin{aligned} \text{Std. error of assay} &= \frac{1.15 \text{ potency } iR}{\frac{kW}{215}} \sqrt{N(1 + V^2/W^2)} \\ &= \frac{1.15(100.3)(0.3010)(24)}{3.08(215)} \sqrt{10 \left[ 1 + \frac{1^2}{(215)^2} \right]} = 3.54 \end{aligned}$$

$$\text{Potency} = 100.3 \pm 3.54\%$$

R = Sum of ranges of  $U_h$ ,  $U_l$ ,  $S_h$ ,  $S_l$

k = constant determined by N

N = average number of animals used at each dose

i = Log. of ratio of H:L.

The first entry in Table III is R which is the range between the maximum and the minimum individual observations. These values are shown as 7, 6, 5 and 6; and the sum of these four values is "summation R" which is 24. Then the sums of the individual weights for each pair of testes as given under each of the four columns are obtained giving the value 226, etc. Three parameters are now determined: "V" is obtained by the formula

$(U_h - S_h + (U_1 - S_1))$ . Due attention must be given to arithmetic sign.

Our next parameter "W" is obtained by:  $W = (U_h + S_h) - (U_1 + S_1)$ . These parameters for V and W are then used in the determinations of the potency. The formula for the potency is given as  $P = \text{antilog of } iV$ , (i is the log of ratio of H: L, that

is the highest to the lowest dose). In this example the value for V was found to be 1 and for W was found to be 215.  $P = \frac{0.3010 \times 1}{215} = 0.0014$ , for which the corresponding antilog is 100.3%.

In computing the standard error, the value for a factor "k" is given in USP XIV: this factor varies with the number of animals used at each dose. It should be pointed out that in theory at least there should be the same number of animals used in each of the four groups: otherwise a correction factor may become necessary. Standard error is obtained by the equation  $\frac{1.15 \times \text{potency} \times iR \times \sqrt{N \times 1 + V^2}}{kW}$ . In this instance the standard

error is  $\frac{1.15 \times (100.3 \times 0.3010)}{3.08 \times 215} (24) \times \frac{\sqrt{10(1+1^2)}}{215^2}$  which

reduces to a value of 3.54. Therefore one might say that the potency for the unknown sample was 100.3% of the reference standard with a standard error of 3.54.

While a great deal of investigation has been underway on other materials these have not yet qualified for official recognition as bioassays in USP XIV. It is probable that bioassays may be developed for tubocurarine and bulbocapnine; also some of the vitamin assays and some hormonal assays may be considered. At this time, however, they have not been included in the page proof which has been distributed for consideration.

Summarizing, the bioassays in USP XIV appear somewhat complex at first glance; however, when the data are available they can be handled readily by the use of previously prepared forms, adding machines or calculating machines and/or a slide rule. The mathematics is not too abstruse and the designs of the experiment have been improved in such a way that each experi-

ment indicates its own limits of confidence, which was not true with several of the earlier bioassays. It seems essential that we shall now begin to give our students an inkling of common statistical procedures, because the development of these bioassays requires a more thorough grounding in mathematical usage than has been the case previously. It is suggested that this could be incorporated readily into the laboratory course in pharmacology or in bioassays, according to the facilities available in various schools. If laboratory facilities are not available, certainly lectures should be extended to include the methods of bioassay, while considering the pharmacodynamics of these products.

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## Physical Pharmacy

### The Nature of and Need for This Course\*

LOUIS W. BUSSE

University of Wisconsin

#### A. Background Material:

The ideas leading to the proposal for the inclusion of the course "physical pharmacy" came from a number of individuals and after pretty thorough discussion of these ideas at several Curriculum Committee meetings and the Pharmacy Seminar of last Summer. It was decided then to explore the possibilities of this course further and to report to The Pharmaceutical Survey. This has been done and Dr. Blaich is including a writeup of this course in his pharmacy report of The Survey.

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\*Presented before the Conference of Teachers of Pharmacy at the 1950 meeting at Atlantic City.

You will recall in the initial report of The Survey Sub-Committee on Pharmacy that the recommended pharmacy sequence was

**Pharmacy Orientation**

**Pharmacy Calculation**

**General Pharmacy I and II**

**Dispensing Pharmacy**

This was recommended as the minimum number of credits to be in effect in a four year curriculum. Also that inorganic pharmacy and organic pharmacy were to be included in the pharmaceutical chemistry area.

The Survey Sub-Committee on Chemistry then met and in their opinion there seemed to be a gap in the instruction in the area of colloids, emulsions, and suspensions. They, in turn, suggested a course called colloids in the pharmaceutical chemistry area. When the Curriculum Committee of the A.A.C.P. met for the first time to consider all of The Survey Sub-Committee's recommendations, it became obvious immediately that a curriculum of more than four years was necessary to meet the minimum requirements as set forth by these committees.

The results of these studies proved pretty conclusively in the Committee's mind that a course in physical chemistry of at least one semester was a must if we were to survive the criticism that pharmacy is a pseudo-scientific profession without an intelligent grasp of the sciences it pretends to utilize. It was also a unanimous opinion that a semester of physical chemistry could not possibly do the job of bringing together all the fundamental principles of beginning chemistry, physics, and quantitative analysis, and make the pharmacy student conscious of the areas of application simultaneously.

This seemed quite logical to the Committee. We were putting first things first. The student was first learning his basic principles and then he would learn to apply them in a course designed to illustrate the application of the rules learned in physical

chemistry. It also seemed quite logical when compared to the treatment given other areas in the pharmaceutical curriculum, i.e.,

BASIC SCIENCE	APPLICATION
(1) General Chemistry	(1) Inorganic Pharmacy—
(2) Quantitative Chemistry	(2) Pharmaceutical Chemistry Quantitative Pharmaceutical Chemistry—Drug Assay
(3) Organic Chemistry	(3) Organic Pharmaceutical Chemistry—Organic Pharmacy
(4) Zoology and Physiology	(4) Pharmacology and Biological Assaying
(5) Botany	(5) Pharmacognosy
(6) Physics and Physical Chemistry	(6) "Physical Pharmacy"

The Committee feels, and justly so, I believe, that if courses in the application of these basic sciences are necessary in these other areas it is just as important here, if not more so, because of the import of physico-chemical principles to the understanding of the methods upon which the art of pharmacy is based. I should like to call your attention here to a paragraph taken from W. W. Charters, *Basic Material for a Pharmaceutical Curriculum* which I believe tells better than any words I could use why pharmacy is a profession.

"After a careful and open-minded study of the pharmacy curriculum for a period of more than two years, the director of the study is definitely convinced that pharmacy is a profession rather than a trade. The materials the pharmacist deals with are, in many cases, so dangerous in their effects upon physical well-being, and the problems that face him in handling these materials and in his contracts with the public require so much intelligence—if they are properly performed—that it is absolutely essential for him to have a rather wide and intimate acquaintance with the fundamental sciences upon which the **art depends**; and since the distinction between trade and the profession lies essentially in the fact that the trade needs to know only the methods in order to be proficient, while the profession needs to know the principles upon which the methods depend, it follows that pharmacy is a profession rather than a trade."\*

If we, as pharmacy teachers, are honest with ourselves and really believe what those words mean, we cannot deny the phar-

\**Basic Material for a Pharmaceutical Curriculum—Charters—p. 13 (1927).*



macy student the basic science background necessary to the understanding of the methods involved in the so-called Pharmaceutical Technique. I like the way Frank Goyan put it in his paper last summer when he said "There is a profound difference between learning to apply *principles*, and learning *rules* that others have developed by applying the same principles. It should be the objective of pharmaceutical education to teach students to become capable of applying scientific principles independently. This is especially true of the application of those principles of physics and chemistry so commonly accepted as elementary physical chemistry." I believe this goal can best be reached by the sequence of courses now proposed which would be general chemistry and qualitative, physics and quantitative, physical chemistry and the applied course tentatively titled "*Physical Pharmacy*."

#### **B. Introductory Remarks Regarding Pharmaceutical Technique and Physical Pharmacy:**

There has been severe criticism of the Survey Subcommittee on pharmacy and the Curriculum Committee of the A.A.C.P. regarding the deletion of the course sometimes called "Pharmaceutical Technique" and in more recent times "The Fundamental Principles and Processes of Pharmacy" from the proposed pharmaceutical curriculum requirements. This was brought to a focal point at the Pharmacy Seminar by the excellent paper of Dean Burt of Nebraska. Here he stated, without reservation, that he couldn't go along with the Committee's recommendation to delete this course on the basis that it was elemental in character and that much of it was a repetition of material given in physics, chemistry and other basic sciences now required.

Now let it be known that the Committee hasn't changed its mind about its recommendation in the light of Dr. Burt's written word. However, an expression by the Committee, stating the basis upon which it made this recommendation is in order here, I believe.

Again the Committee's decision was made on the basis of what it considered good pedagogy or sound educational thinking. It was the unanimous thinking of the Committee from the outset that sound pharmaceutical education could only be based on an

adequate basic science training. That in no area should professional instruction be used to teach fundamentals and application at the same time at a sacrifice of good training in the basic science area involved. Here the Committee felt that it would be wrong to utilize four to six credits from a four year curriculum for instruction of this type with the background of the student upon which to build. It was the opinion that it would be sounder educationally to utilize those credits for physical chemistry and a mathematical background, and make the application necessary in the general pharmacy courses and dispensing courses than to crowd the curriculum with professional instruction and not make possible an adequate basic science background in the four year program.

After the A.A.C.P. Curriculum Committee had met several times, it became quite clear to them that the only pharmaceutical educational program which the Committee could recommend which would meet the objectives of both the Charter's Survey and the more recent Survey would require as a minimum two years of pre-professional training and four years of professional instruction. It also became obvious that the professional instruction could now be expanded to include the applied courses wherever necessary. It definitely was decided that it would be better education not to reduce the effectiveness of a fundamental physical chemistry course by attempting to make application here. It was the opinion that physico-chemical principles were of enough import to an understanding of the art, that a separate treatment was definitely in order, i.e., fundamental and application. It is with this background in mind that I, today, on behalf of the Curriculum Committee am presenting a brief outline of the material which would be covered in the proposed course "physical pharmacy."

### **C. Physical Pharmacy:**

Physical pharmacy may be defined as "the application of physical-chemical principles and laws to a study of pharmaceutical systems. It is meant to embrace a study of the application of physical and chemical principles or laws to the preparation of modes of administration (pharmacy) and to serve as an aid in

order to better understand the manner by which the vehicle influences the rate or degree of activity of the drug.

The objectives of this course are:

- a. To increase the understanding of the physical-chemical laws as they apply to pharmaceutical systems.
- b. To develop the ability to analyze (interpret) quantitatively the physical-chemical aspects of pharmaceutical systems.
- c. To develop the ability to apply these principles to the formulation of various modes of administration.
- d. To increase the familiarity of the student with the instruments used in the physical-chemical studies of pharmaceutical systems.

The basis for this course should be:

- |                                |               |
|--------------------------------|---------------|
| a. Calculus                    | One semester  |
| b. Quantitative analysis       | One semester  |
| c. Organic chemistry           | Two semesters |
| d. Physics                     | Two semesters |
| e. Physical chemistry          | One semester  |
| f. Pharmaceutical preparations | One semester  |

It should carry four semester hours of credit preferably divided as three didactic and one laboratory (three lectures and one 3 hour laboratory per week).

An outline of the lecture material is suggested as:

- a. Structure of matter
- b. Solution and solution equilibria
- c. Colloids and suspensions
- d. Emulsions
- e. Powders
- f. Physical rate process.....
 

{	Viscosity
{	Sedimentation
{	Diffusion
- g. Chemical rate process.....
 

{	Hydrolysis
{	Oxidation
{	Decomposition

The laboratory material which should supplement the lecture presentation might be outlined as follows:

- I. None on states of matter
- II. Solution and solution equilibria
  - a. Solubility of drugs at different pH levels in strongly buffered media.
  - b. Solubility effects of salts on organic compounds.
  - c. Stability of amphoteric compounds in solution at different pH levels.

- d. Partition coefficient experiments and effects of pH and salts on phase solubility.

1. Effect of preservatives in two phase systems.

**III. Colloids:**

No experiments above those in physical chemistry.

**IV. Suspensions:**

- a. Effect of pH and concentration on viscosity as a relative measure of the suspending properties of viscosity inducing substances used in pharmacy.

**V. Emulsions:**

- a. A study of the surface tension reducing properties of surface active agents used in medicine and pharmacy.

1. Sterols, gums, proteins, saponins and anionic and cationic agents in general.

2. Critical concentration studies, Micelle formers and non-formers, Solubilization studies on micelle formers.

3. Antagonistic emulsifying agents

Chemical

Coacervate formation

**VI. Powders:**

No experiments are suggested under this heading.

**VII. Physical rate processes**

1. Diffusion—of dyes of different molecular size in agar medium.

2. Viscosity studies (Sedimentation)

**VIII. Chemical rate processes**

1. Hydrolysis—aspirin, phenylsalicylate

2. Oxidation—adrenalin, physostigmine

3. Decomposition—hydrogen peroxide solution

Yellow mercuric oxide

Potassium mercuric iodide

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## Sample Laboratory Experiment

### EXPERIMENT 10

#### Partitioning of Drugs Between Two Immiscible Liquid Phases Influence of Concentration and pH

**Purpose:**

To become familiar with laws governing the equilibrium distribution of medicinals between two immiscible liquid phases.

**Theory:**

Partitioning of drugs between two immiscible or slightly miscible liquid phases is important pharmaceutically in two ways. First the partitioning phenomenon must be considered in the preparation of modes of administration containing two liquid phases such as creams and emulsions. Secondly, the efficacies of certain types of medicaments are largely governed by their partition coefficient between body liquids and serum.

The partition or distribution coefficient may be defined as the distribution ratio of a substance between two slightly miscible liquid layers. This can be mathematically formulated as

$$\text{Partition coefficient} = \frac{\text{Concentration of drug in one layer}}{\text{Concentration of drug in second layer}}$$

This relationship is based on the thermodynamical postulate that if a system is at equilibrium, the fugacity (or escaping tendency) of any given component is the same throughout the system. Or

$$f_A = f_B \quad \text{where A and B refer to the two layers.}$$

But  $f_A = f_{A^\circ} a_A$  where  $f_{A^\circ}$  maybe defined as the fugacity of the solute present at unit activity in layer A and  $a_A$  is the activity of the solute

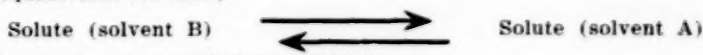
in layer A. Similarly  $f_B = f_{B^\circ} a_B$

At equilibrium  $f_{A^\circ} a_A = f_{B^\circ} a_B$

$$\text{Or } \frac{a_A}{a_B} = \frac{f_{A^\circ}}{f_{B^\circ}} = \text{constant}$$

At low or moderately low concentrations we can substitute concentrations for activities, giving equation 1.

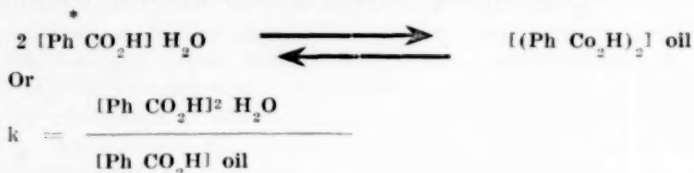
The same relationship can also be derived more generally by considering the mutual transfer of solute across the phase boundary as an equilibrium reaction;



And we have the equilibrium constant

$$k = \frac{[\text{Solute}] (\text{Solvent A})}{[\text{Solute}] (\text{Solvent B})}$$

Where the solute undergoes dissociation or association, the relationship must necessarily be modified. For example, in the case of benzoic acid which dimerizes in nonpolar solvents we have



Influence of pH:

Changes in pH have only minor secondary influence on the partition coefficient of all substances other than acids or bases. However, with those compounds whose degree of ionization is governed largely by the pH of the system, the apparent partition coefficient is strongly influenced by pH. For example with alkaloids which obey the dissociation relationship

$$k^b = \frac{\text{[Alk. H}^+ \text{]} \text{ [OH}^- \text{]}}{\text{[alk.]}} = \frac{\text{[alk. H}^+ \text{]} K^w}{\text{[alk.] [H}^+ \text{]}}$$

we can write

$$k' = \text{Apparent partition coeff.} = \frac{\text{Total Alkal. conc. in H}_2\text{O phase}}{\text{Total Alkal. conc. in oil phase}}$$

$$= \frac{\frac{\text{[Alk.]} \text{ H}_2\text{O}}{\text{[Alk.] oil}} + \frac{\text{[Alk. H}^+ \text{]} \text{ H}_2\text{O}}{\text{[Alk.] oil}}}{\frac{\text{[Alk.]} \text{ H}_2\text{O}}{\text{[Alk.] oil}} + \frac{\text{[Alk. H}^+ \text{]} \text{ H}_2\text{O}}{\text{[Alk.] oil}}}$$

Furthermore, the first term in the last expression is the true partition coefficient of the alkaloid  $k_0$ . By substituting  $k_0$  into the equation we obtain the following

$$k' = k_0 + \frac{\frac{\text{[Alk. H}^+ \text{]} \text{ H}_2\text{O}}{\text{[Alk.] oil}}}{\frac{\text{[Alk.]} \text{ H}_2\text{O}}{\text{[Alk.] oil}}} = k_0 + k_0 \frac{\frac{\text{[Alk. H}^+ \text{]} \text{ H}_2\text{O}}{\text{Alk.}}}{\frac{\text{[Alk.]} \text{ H}_2\text{O}}{\text{H}_2\text{O}}}$$

This relationship can be simplified by introducing the dissociation constant of the base

$$k' = k_0 + \frac{k_0 \cdot K^b \text{ [H}^+ \text{]}}{K^w} \quad 3$$

\* = Phenyl group



An analogous equation for organic acids can be shown in a similar manner to be

$$k' = \frac{k_o + k_o K_a}{[H^+]} \quad 4$$

Both equations can be transformed into their logarithmic equivalent, e.g.

$$\log [k' - k_o] = \log k_o + pK_w - pK_b - pH \quad 5$$

and

$$\log [k' - k_o] = \log k_o - pK_a + pH \quad 6$$

for the alkaloids and acids respectively.

#### Apparatus and Reagents:

25 ml. burette; 150 ml. separatory funnel; 5, 10, 25, and 50 ml. pipettes; absolute alcohol, acid-free benzene, 0.1000 molar benzoic acid solution in benzene; 4.00, 4.50, 5.00, and 5.50 pH 0.5 molar citrate buffer; 0.01 N standard alcoholic sodium hydroxide.

#### Procedure:

Standardize the standard base against 5 mls. of the benzoic acid solution, first adding 5 mls. of absolute alcohol to facilitate titration. Use meta cresol purple as the indicator.

Pipette 50 mls. of freshly boiled, cooled, distilled water into the separatory funnel. Add 50 mls. of the benzoic acid solution. Shake for three minutes and allow to stand until the layers are well separated. Pipette out 25 mls. from each layer into clean Erlenmeyer flasks. Titrate the entire aqueous sample, first bringing it to a boil to remove dissolved carbon dioxide. Use phenolphthalein as the indicator. Titrate 2 ml. aliquot of the benzene sample, again using 5 mls. of alcohol and meta cresol purple.

To the solutions remaining in the separatory funnel add 25 mls. of the boiled distilled water and 25 mls. of benzene. Shake again for three minutes and repeat the procedure given in the preceding paragraph with the exception that 5 mls. of the benzene sample be titrated. Repeat the dilution and sampling procedure twice more. From the data obtained calculate the partition coefficient of benzoic acid between pure water and benzene.

Prepare an exactly 0.01000 molar benzoic acid solution in benzene by tenfold dilution of the 0.1000 molar solution. Extract 50 mls. of this solution with 50 mls. of the 4.00 buffer. Titrate a 25 ml. aliquot of the benzene layer. Run a blank the same way, using pure benzene instead of the benzoic acid solution.

Repeat the entire procedure with the remaining three buffer solutions. Plot the apparent partition coefficient calculated from the data obtained against the hydrogen ion concentration and compare with the theoretical curve.

1. Explain why a much higher concentration of any phenolic type antiseptic is necessary to be effective in an oil base than in an aqueous medium.
  2. Explain why substances such as Benzoic acid or the parahydroxybenzoates will not preserve two phase systems (o/w) for any long period of time when used in the same concentration as is commonly used in an aqueous medium.
  3. Calculate the benzoic acid concentration in a 50% benzene water emulsion in which the water phase originally contains 0.5% sodium benzoate and subsequently buffered to a pH of 5.0.
- 

## New in the Family

**James Courtney Stirland**, born November 2, 1950, son of Prof. and Mrs. Gordon B. Stirland, Oregon State College.

**Michael Chambers**, born October 12, 1950, son and first child of Dr. and Mrs. M. A. Chambers, University of Texas.

**Richard Dale Roth**, born November 6, 1950, son of Lt. Col. and Mrs. Henry Dale Roth, The Ohio State University.

**George Pitkin McCarthy**, born November 24, 1950, son of Dr. and Mrs. Walter McCarthy, University of Washington.

**Steven Paul Kanig**, born October 22, 1950, son of Prof. and Mrs. Joseph L. Kanig, Columbia University.

**James Gordon Routson**, born November 16, 1950, son of Mr. and Mrs. Jack C. Routson, University of Wyoming.

**Madeline Susan Ambrus**, born December 13, 1950, daughter of Dr. Julian and Dr. Clara Ambrus, Philadelphia College of Pharmacy and Science.

## **The President's Page**

As I write this on New Year's Day of 1951 my mind is overflowing with the many difficult and vexatious problems which confront the world and our country in particular. My wife and I remained at home last night, New Year's Eve. We had no celebration, no party, just the two of us with our thoughts, our hopes, our wishes. Came the hour of midnight and the beginning of a new year, we kissed, wished each other the best of everything, constrained our deeper feelings of doubts and uncertainty and quietly retired.

Now on New Year's Day morning I am writing my message. I fully realize that on such a day we are prone to ponder over problems of global significance and as we try to estimate the impact of the present dire political situation upon our national and communal life our small world of pharmaceutical education becomes relatively insignificant as compared to the prevailing forces which threaten our very existence.

Such comparisons, however, lead only to eventual defeatism. They furnish an unconscious excuse for us to sit back and do nothing. In our immediate thinking of matters pertaining to pharmaceutical education we should put aside any feeling that a world war is inevitable with all its horror of death and destruction. We should forget the atom bomb and remember that during its same period of production we have also witnessed the scientific development of numerous antibiotics and other important drugs which will save more lives than the bomb will ever destroy. We must have sufficient faith in our national leaders, in our Congress, in our Army and Navy to confidently entrust them with our fight for continued freedom and to rest assured that our country and our American way of life will prevail.

There is little that we can do as individuals or as an association to change national destinies or future world history. We can act as loyal citizens and freely and ungrudgingly accept the sacrifices which must be made. No doubt there will be higher taxes, diminished living standards and many of our near and dear ones will be called upon to enter the armed services. Such sacri-

fices are great but will be made alike by citizens in all walks of life. We, however, who profess to be leaders in an important phase of professional education can not allow such matters to interfere with our own constructive progress. We of the A.A.C.P. have made pharmaceutical education our life's work and must meet our responsibility for the continuation of its progress and its guidance. If these are times of sacrifice and of fear, they are also times of opportunity. We now face a challenge which of itself forces us to give up lethargic thinking and to replace it with imaginative concepts, capable of development into constructive accomplishments.

A number of weighty problems confront our membership. Some of these are not new but remain with us as a result of past inability to reach a final consensus of opinion. The most pressing of these is the question of the minimum length of college study for a pharmaceutical degree. It is now 19 years since we advanced from a three year course to the present four year minimum requirement. If the inauguration of a four year professional course was justifiable in 1932 then the many advances made since then in scientific fields and the general acceptance of the fact that all college graduates should possess certain fundamentals of a cultural education must logically guide our action on this question.

The problem of adequately financing our Association also still confronts us. In addition new difficulties will certainly arise because of our national mobilization efforts. Student numbers will be greatly reduced. A demand for acceleration of courses will no doubt again be voiced. An expanding industry will make inroads on our teaching staffs.

Yes, we will have a busy year, full of difficult and vexing problems. I only hope that we can act in a spirit of full realization of the needs of education and not be unduly influenced by the complexities of the world situation. Business may make an effort and be satisfied to go on "as usual" but education should forge ahead at all times. Let us remain calm in thought and free from jitters.

With this final word of caution I extend to every staff member of our constituent colleges a most prosperous, happy and successful New Year.

HUGO H. SCHAEFER.

## The Editor's Page

"A Pharmacist who has studied the history of his profession is a better member both of the profession and of society as a result of his discipline, for the concept of the history of pharmacy is cultural and humanitarian in that the individual facts of pharmacy as a profession can only be perceived in the general context of society and the life of the community. Pharmacy touches and is touched by the entire environment in which it is practised, an environment of peoples, cultures and sciences throughout the ages. It is this fact which makes the history of our profession so rich and all-embracing and the pursuit of such a study results in elevating the student to be a citizen of the world of culture, a member of the army of cultured people forming the intellectual elite of the world. The supplying of drugs to the people has been carried out through the ages and all the branches and phases of this supply are the concern of the history of pharmacy; the basic sciences are a natural background, but so, too, are economics, law and legislation, the fine arts, the classics, language, literature, general history and philosophy, all have made some impact upon pharmacy and upon the science and practice of the profession.

"It is the right of every student of pharmacy to receive instruction in the broader cultural aspects of his profession for these will tend to awaken his interest, foster his intelligence, and arouse his enthusiasm for the wellbeing of his fellows. As in other countries, this instruction should be given in the schools of pharmacy along with the other professional studies; in the United States of America such courses have already been introduced into the four-year pharmacy curriculum. Professor G. Urdang, holder of the newly created chair of historical pharmacy at the University of Wisconsin, has played a leading part in fostering the growth of the Historical Section of the American Pharmaceutical Association, in the creation of the American Institute of the History of Pharmacy and in stimulating historical studies in the colleges of pharmacy. He is the author of numerous texts on the subject, and, with the collaboration of a member of his staff, Mr. G. Sonnedeker, has produced a booklet, 'Teaching History of Pharmacy,' 1950, reprinted from **The American Journal of Pharmaceutical Education**. This publication is designed to help pharmacy teachers to organize their courses of undergraduate and post-graduate studies. Five papers, which formed the basis of a seminar of teachers held in the University of Wisconsin in 1949, are reproduced; they deal with the broad concepts of the subject, and, as for all historical studies, emphasize the need for a general survey course supplemented by specialized courses dealing with in-

dividual phases or parts of the field. The central theme is provided by the general survey, and this gives an idea of the development of the profession from the very beginning of the use of drugs, tracing its development and changes in different ages and countries, including our own. The specialized courses must each contain some focal theme and be linked to the general survey, instead of being an independent and disjointed collection of facts. In the final chapter an outline is presented of the scheme of post-graduate work required by the University of Wisconsin for the Master's degree or the Ph.D. degree in the history of pharmacy and science, either as a major subject, or as a minor subject along with other pharmaceutical studies such as pharmacognosy or pharmaceutical chemistry.

"The contribution which the study of the history of pharmacy can make to our profession, to society and to our place therein has been largely overlooked in Britain, and we are lagging behind the majority of our neighbors in this respect. Such historical studies are the right of each one of our students as a part of their culture, and it is to be hoped that in the future this subject will take its place in our pharmaceutical curriculum. Moreover, abundant historical matter of interest for specialized study rests buried and unknown in our British pharmacies; there is scope here for historical research work in which the practising pharmacist can take part and in which he can contribute a great deal to our profession and to the unfolding story of our own civilization."

This quotation is an editorial which appeared in the November 11, 1950 number of *The Pharmaceutical Journal* (British) No. 4551, Vol. 165, 4th Series, Vol. III, p. 294, under the title "The Roots of the Profession". It is reprinted here because it gives a broad, four-square picture of what qualities the pharmacist should possess and comments upon the study of history as an essential factor in the acquisition of those qualities.

The editorial stresses the point that the pharmacy student himself has some rights. It is his right that he receive instruction that will make him an outstanding citizen, comparable in every way with members of the other professions, and the intelligent public which he serves. As we read the editorial we were reminded of what Dr. W. W. Charters said, when he wrote the report of the Commonwealth study, of the function of the pharmacist a quarter of a century ago. We quote from that report:

"In the first place he is a man as well as a pharmacist, and as such he has certain obligations and satisfactions in connection with his family as a husband and father, with his country as a citizen, and with himself as an individual. He must possess the qualities of intelligent and force-



ful manhood; he should enjoy life, art, and religion; physical and mental fitness are obligations to his friends and family and a source of pleasure to himself." . . . "Every college student—Irrrespective of vocation—can demand as his right the training necessary to make him a 'cultured' man. But the task of determining just what should be the content of this extra-vocational curriculum is itself a major problem and one much more complex than is the determination of the vocational curriculum."

We are now confronted with that last statement as we plan a longer educational program. It is a problem the arts and science faculties have wrestled with for years without coming to unanimity of opinion.

But one thing is certain, no area of professional activity has ever progressed without the development of a morale. The study of history is a builder of morale. Again we quote from the Commonwealth study:

"The history of pharmacy should be taught as a major means of developing professional morale. It should include (a) a description of the origin, evolution and present status of the profession, and (b) a study of outstanding pharmacists of the past and present in connection with their contributions to the art and science of healing. The material should be as vivid as possible and should reveal the romance of pharmacy. It will fail in its object if it is a mere recital of bald facts. The textbook on history should be a volume of dramatic literature of compelling interest."

Whether it be in the field of medicine, pharmacy, chemistry, biology or the fighting forces, morale building is essential. We believe if the President of the United States had been a student of the history of the marines instead of Pendergastian politics, he would have been a greater leader and saved himself from some embarrassing experiences.

And finally, we print this editorial also, because, having been printed in the official organ of The Pharmaceutical Society of Great Britain, it is a fine tribute to George Urdang, a great scholar and an untiring worker for the advancement of pharmaceutical education and practice through the study of pharmaceutical history.

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One of the favorite indulgences of those who are historically minded, is to rummage among the editorial columns of old pharma-

ceutical journals that were printed close to turn of the century, for they reveal the pharmaceutical thinking of the time.

There are few men in the educational group now alive, who had the privilege of enjoying the fellowship of the late beloved and inspiring Marylander, Henry P. Hynson. He was a retail druggist, an educator, and a manufacturer, all three in one, a rare triple personality. Rambling through the pages of the June 1916 number of *The Pharmaceutical Era*, I found on page 218, an editorial entitled, "Knowledge of Natural History Essential" which reads as follows:

"In his address before the New York Branch of the American Pharmaceutical Association last month, Prof. Henry P. Hynson, of the University of Maryland, Baltimore, emphasized a point, which although it may have seemed simple enough to him as a teacher, is too often lost sight of by the average student and pharmacist. He stated that a knowledge of natural history was necessary and a prime requisite to one attempting to solve any problem relating to the special properties or uses of drugs. Many teachers apparently neglect the necessity of convincing their students of the importance of such knowledge, for if utilized to its full extent, the results of such information are promising and always helpful.

"Working hypotheses are largely built up from an elaboration of primary or fundamental facts, for it is from them that we are led into the secondary construction or arrangement of ideas and experiments which, when carried to their logical conclusion, tend to bring the mysterious or unknown into the realm of the knowable. Applied to dispensing pharmacy, and this was the main subject of Prof. Hynson's address, this process of investigation, beginning with the natural history of the drugs under consideration, has helped to solve many a prescription difficulty. We have read of how the detective reconstitutes the circumstances of a crime from the 'clues' at his disposal, and the zoologist may reconstruct an extinct reptile and its environment from 'fossil remains'. In a similar manner the knowledge of the natural history of a drug becomes of importance in furnishing clues and facts which become suggestive and helpful. This is a rational method, for it is the intellectual organization of these facts that leads to logical results.

"There is no more interesting study in all pharmacy than that which relates to the natural history of drugs. The scope of the study is wide and the material practically unlimited. Such material should be considered in its natural setting and studied in relation to it. As products of their environment the very clue to the meaning of most drugs lies in a knowledge of their surroundings and natural properties. The art

of the compounder calls for the application of the widest knowledge and scientific attainment that he can acquire."

One could hardly write, using an equal amount of space, a better defense for the introduction of the biological sciences into the pharmaceutical curriculum than the one that is set forth in these lines.

This editorial is sandwiched in between two others that are just as revealing of the thinking of the time. One is entitled, "The Proprietors House Cleaning" and from it I quote in part:

"As reported in the news columns of **The Era** this month, the members of the Proprietary Association of America held their annual conference in New York last month, and if we can size up the proceedings correctly, the association seems to be making an honest effort to set its own house in order. The report presented by the committee on requirements for admission into the organization, shows that much good in this direction has already been accomplished. The most vulnerable point of attack against proprietary medicines has been the false pretenses urged by many manufacturers in the use of misleading claims in their advertising matter, and such an opening has always invited criticism even by those who have favored the use of ready-to-use medicines. That many manufacturers are beginning to realize this is shown by their present method of work."

The other half of the sandwich is entitled "Military Training in College" and from it I quote in part:

"That pharmacists should be interested in the subject of 'national preparedness' at this time is not at all strange, and the proposition to provide methods of study of a military character by the colleges is but one phase of the great question that is before the American people today. Statesmen, educators and the plain citizens are all asking of themselves and of each other what should the nation do to be adequately prepared and how can this preparation be best accomplished. None of them want a large standing army nor a large paid force that will burden the country with onerous taxes. They do want, however, a force of sufficient magnitude and training to defend the country in case of attack and to ward off aggressive action on the part of an unscrupulous foe. As a citizen, the pharmacist is interested in this subject for he must do his part in maintaining the welfare of his country in times of peril. All privileges carry corresponding responsibilities, and if the pharmacist is to be a beneficiary of the Republic, he must also expect to do his duty when called upon or forfeit forever his claim to protection.

"That the men in pharmacy and the resources of the pharmaceutical profession are destined to become an important factor in any scheme of

national preparedness will be admitted by any intelligent citizen who will give the subject a moment's consideration. That the educational institutions are considering these present day problems by providing training for national defense, is evidence of the importance of this kind of instruction. Has the pharmacy student any obligation to prepare himself for eventualities that may occur to his country? History, experience and logic, all seem to answer the question in the affirmative."

All of which goes to show that the problems which pharmacy faced in the second decade of the century are the problems which it faces in the sixth. There is little new under the sun. There are those who thought "The Pharmaceutical Survey would reveal something startling. It didn't and we did not expect it to. What it did do was to show us with mathematical accuracy the road pharmaceutical education would have to follow if pharmacy was not to committ professional suicide. The Survey was a fact finding instrument. It also set a new horizon, but it is up to every interest in pharmacy to put the shoulder to the wheel and push pharmacy beyond the boundaries of the old horizon into the new.

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I read with great interest the message of President Frank W. Moudry before the annual meeting of the National Association of Retail Druggists in Long Beach, California, last October. It was a broad and scholarly presentation of our problems; I would like to say of our mutual problems. Too long have the various divisions of pharmacy been isolationists, as far as their own interests are concerned. At last we are coming to the realization of the fact that the problems of pharmacy, whether educational, retail, or industrial, are all dependent upon each other. There is no better evidence of the recognition of this fact, than the creation of the American Foundation for Pharmaceutical Education which has generously come to the support of pharmaceutical education. Not only have the manufacturers and the wholesalers recognized the need of their support to pharmaceutical education, the practising druggists recognize that they have a responsibility in furthering the educative process. No longer do I hear of any druggist saying to any pharmacy student, "What in the hell are you studying pharmacy for?" They are recognizing the value of a broader basic and more extensive professional training.

All through President Moudry's message runs the theme of teamwork. When he comes to the matter of the curricula of the colleges of pharmacy, he says the trend is encouraging but little progress has been made in including courses in pharmaceutical economics and in cases where it has been done the courses are unrealistic. Of course economics is economics just like chemistry is chemistry. What the student needs, to become a chemist, is a great number of fundamental courses in general, qualitative, quantitative, organic, colloidal, biochemistry, and physical chemistry. Then he has a foundation to go into industrial chemistry in some special field. Today he gets his special training in a specialized industrial plant.

From an educational point of view, what a student needs for pharmaceutical administration, are basic courses in economics, accounting, store management and salesmanship. And today he makes the application in a drug store. The only place to learn the details of drug store management is in a drug store. He can't learn them in a grocery store or hardware or a mortuary or a play drug store in a college of pharmacy, any more than a medical student can ever become a surgeon if he is not allowed to take a knife in his hand. When the time comes that we are allowed more time to give this basic instruction and qualified teachers are available who have had the same kind of basic instruction plus successful management of a drug store, then students will be better prepared in this special field of administration.

Retailers do have a responsibility in the moral and financial support of the colleges of pharmacy. I am reminded that many years ago as I approached the office of Chancellor Lindley of the University of Kansas (who by the way, was a registered pharmacist), I met a group of men just leaving the office. When I was safely inside and the door was closed, Chancellor Lindley informed me that those men were a group of optometrists who had been meeting with a committee of the Board of Regents, asking them to introduce some courses into the program of the University of Kansas that would be helpful to them in their professional work. He said the Regents were inclined to do something for them. Then he continued by saying, "In all the years I have been chancellor of this university no retail druggist has ever darkened the door of my office in the interest of pharmaceutical education." In

that simple but forceful way, the Chancellor pointed the way to get support for pharmaceutical education.

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There is still misunderstanding about the publication of the title page and index of *The Journal* with the completion of a volume. The volume ends, of course, with the October number. The index cannot be completed until the final issue is in print. In order not to delay the mailing of the issue, the index which takes some time to complete, is always mailed out as a supplement with the January issue following. The index for volume XIV was prepared by Prof. Zada M. Cooper, who has prepared the indexes for the preceding thirteen volumes. This she does in the midst of days crowded with other activities. For her sustained interest in the work of the Association and her application to the tiring task of index construction, we are exceeding grateful.

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Friends, everywhere, were shocked by the announcement that Mrs. Orlene M. Plein, the wife of Dr. Elmer M. Plein of the University of Washington, passed away on November 15, 1950. Mrs. Plein was born in Memphis, Nebraska, on May 15, 1907. Her parents were Mr. and Mrs. Walter H. Wilson, who later moved to Boulder, Colorado, where the daughter had her grammar and high school training. She was graduated by the University of Colorado in 1929, having majored in history and the Romance languages. From 1929 to 1932 she taught history and the Romance languages in the High School Division of the Consolidated School System of Ault, Colorado. She and Dr. Plein were married July 18, 1932.

Like all good and great women, her interest was centered in her home. But she had in addition, outside interests which were boundless. During her stay in Washington she was a member of the Faculty Wives Club; the Faculty Wives First Group Garden Club; Dr. Mabel Seagrave Guild of the Childrens Orthopedic Hospital; sponsor of the University of Washington Dames Club; advisor to Lambda Kappa Sigma, Women's Pharmacy Association;



and Past-Secretary of the Colorado Alumni Association of the Puget Sound Area. She was especially devoted to the welfare of the students who had a great affection for her. She had formed friendships throughout the nation and she will be tremendously missed at our annual meetings. Our sympathy goes out to Dr. Plein in his great loss which is ours also. But again we take consolation in the promises of the Easter morning.

RUFUS A. LYMAN.

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**Animals' Healthmate** is a monthly bulletin published by the American Animal Health Pharmaceutical Association. The bulletin is charged with useful information connected with improving and maintaining the health of animals which contribute so immensely to our food supply, and its contents should be of the greatest interest to pharmacists. The importance of this field is just now being emphasized by the introduction, into our college curricula, of courses dealing with the pharmaceutical needs of agriculture and the animal husbandry industry. **Animals' Healthmate** may be obtained by addressing the editor, who is also secretary of the association, Dr. C. L. Campbell, 1705 Locust Street, St. Louis, Missouri. Dr. Campbell has recently been honored by the St. Louis College of Pharmacy and Allied Sciences, by being granted the degree of Doctor of Science, **Honoris Causa**, "In recognition of outstanding service in the field of Pharmacy and Pharmaceutical Education". The second annual meeting of this youngest of pharmaceutical associations will be held in Little Rock, Arkansas on March 7, 8, and 9, 1951, immediately following the annual meeting of District No. 6 in that city.

## Gleanings from the Editor's Mail

Dear Editor:

A full measure of personal and professional thanks for your thoughtfulness in sending me the copy of the October number of **The American Journal of Pharmaceutical Education**. I am convinced that the American Foundation makes no wiser investment of its funds than its contribution to **The Journal**. In my judgment this contribution should be twice as large as it is.

Tucson, Arizona  
January 15, 1951

EDWARD C. ELLIOTT

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Dear Editor:

I appreciate very much the gesture of the Foundation in sending **The American Journal of Pharmaceutical Education** to college presidents. It helps us to keep up with what is happening in pharmaceutical education.

Clarksville, Arkansas  
August 19, 1950

FRED A. WALKER, PRESIDENT  
College of the Ozarks

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Dear Editor:

In accordance with your request I am sending you the manuscript of my brief address before the new chapter (University of Pittsburgh) of Rho Chi entitled, "The Significance of Honor Societies". The use of the conception of a standardized article in connection with member-

ship in an honor society is by no means original with me. During my graduate school life and all of my teaching days I was very active in the administration of Phi Lambda Upsilon, the honorary chemical society. The first national president, Bradley C. Gardner, used the comparison with the Bureau of Standards' seal around 1909 when the society had only three chapters. I cannot give a specific reference to his remarks and they were limited only to a comparison between the seal and election to Phi Lambda Upsilon. I have been building on that foundation ever since and with students in pharmacy have been trying to implant in them a correct idea of the meaning of an end—use standard.

Mellon Institute of Industrial Research  
December 19, 1950

GEORGE D. BEAL  
Assistant Director

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Dear Editor:

Enclosed please find the manuscript entitled, "A Mission to Oxford". I hope that this will be suitable for your needs. In as much as other currently published papers such as Dr. Hampshire's recent one in the **Journal of the American Pharmaceutical Association** have dealt with pharmacy in Great Britain, I have decided to report on the Oxford University visits in considerable detail rather than my visits with members of the British Pharmaceutical Society. Nevertheless I have mentioned certain members of the London School of Pharmacy Staff in connection with the work going on at Oxford. It occurred to me that readers of **The Journal** might be interested in the Oxford work rather than a repetition of accounts already published on the activities of the British Pharmaceutical Society.

As you will gather from my writing, I was deeply impressed with the energies of Dr. James and His Medicinal Plant Group, for I saw in these activities much material for similar researches among pharmacists in our country, especially in the biochemical interests now prevalent in pharmacognosy.

University of Washington  
December 29, 1950

HEBER W. YOUNGKEN, JR.

## Notes and News

**Alabama Polytechnic Institute.**—Profs. G. W. Hargreaves and J. M. Rash, and 40 senior students attended the annual pharmacy seminar of the Alabama Pharmaceutical Association at Howard College, Birmingham, November 16. Prof. Hargreaves presented a review of new U.S.P. and N.F. drugs. The next seminar will be held in Auburn.—Preliminary plans for the new pharmacy building have been approved by the Campus Planning Committee and the architects are now drawing the working plans. Construction is planned to start early this year.—Dean Blake, accompanied by architect W. P. Show, recently visited the University of Michigan, Purdue, and Ohio State, as well as the Eli Lilly Laboratories and the Kewaunee Manufacturing Company plant, gathering information and ideas to be incorporated into the new building.—Pharmacy seniors, W. B. Northcutt and J. T. Vinson, were initiated into Phi Kappa Phi at the December meeting of the society.

**University of Buffalo.**—Dr. Harry K. Imamoto, B.S., M.S., University of California, Ph.D., University of Maryland, has been appointed assistant professor of pharmacology. Miss Olga Shumsky has been named as instructor in pharmacy.—The fall enrollment totaled 328 which included graduate students.—The Borden Award of \$300 to the student attaining the highest average his first three years, went to Oscar Kapczynski.—Two \$1,500 American Foundation fellowships are held by Robert J. McIsaac and Arthur H. Martin.—Twelve other scholarships, ranging from \$100 to \$200, have been awarded to undergraduates for excellence in scholarship.—Two pharmacy seniors, Dorothy J. Barone and Robert E. Wagner, were elected for inclusion in the 1950-51 edition of "Who's Who Among Students in American Universities".—Mearl D. Pritchard of the pharmacy staff has been elected president of the newly organized Erie Pharmaceutical Association and Dr. LeRoy C. Keagle was named chairman of the Grievance Committee of the same organization.—Dean A. Bertram Lemon has been named chairman of a special statewide pharmacy advisory committee on Selective Service.—"Radioisotopes and Their Medical and Pharmaceutical Applications" by Dr. Edward M. Bridge, professor of pharmacology, and "Opportunities for Pharmacy Graduates in Industry" by Mr. Fred McNabb of the Eli Lilly Company, were lectures recently presented before the student branch.—Gamma Iota Chapter of Kappa Psi was reactivated last November and 32 new members initiated.—The first issue of "The Script", a new monthly student publication, came from the press in December.

**Butler University.**—The hospital at the Indiana University Medical Center, Indianapolis, completed plans for expansion last summer. Nearly \$40,000 were expended in remodeling and equipping a new manufacturing laboratory. Butler University pharmacy students are assigned in small groups throughout the year for work in this dispensary.—Dr. Karl L. Kaufman was a member of a panel for the discussion of the topic, "The Future of Pharmaceutical Education" at the Druggist Business Conference held at Lafayette, Indiana, in November.—The department of biology has purchased 33 microscopes valued at \$8,700.—The total enrollment for the current semester is 284.

**University of Colorado.**—The college of pharmacy has completed moving into its new quarters. Laboratories have been provided and equipped for operative, dispensing and manufacturing pharmacy, and for microscopy, pharmacology and research.—Two new instructors have joined the staff. Mr. Fred Armstrong who holds degrees from the State University of Iowa and Drake University, and who was formerly a research and teaching fellow at the University of Utah, has been appointed instructor in pharmacology. Mr. Laurence R. McArthur, who holds degrees from the University of Idaho and Idaho State College and has taken graduate work at Purdue, has been appointed instructor in manufacturing pharmacy.—Mr. Fred Drommond, instructor in pharmacy, is on leave for the current year and is completing work for the doctorate at Purdue.—The pharmacy graduate program has been enlarged and is now accepting students who desire to work toward the Ph.D. degree.

**Columbia University.**—Twenty-one of the 90 members of the freshman class had some collegiate training before registering for pharmacy. Twenty-three of the 351 undergraduates have received their pre-pharmacy collegiate preparation outside of the United States.—New equipment in the various laboratories include an electric autoclave, new microscopes with oil immersions, a stainless steel roller mill and a jacketed colloid mill.—Both day and evening classes are being held in the industrial manufacturing laboratory. Prof. E. E. Leuallen is giving a new course in dermatological vehicles.—New pharmaceutical specialties are placed in a new display case in the college foyer for one week so that students may have an opportunity to see them when they first come onto the market and before they are finally placed in the model pharmacy.—Both students and faculty have shown much interest in the preparation of exhibits of timely interest to be placed in the foyer cases. Special displays have been made of antibiotics, antihistaminics, and products of the orange.—Profs. Leuallen and Pokorny have been granted honorary membership in the professional fraternity, Sigma Tau Epsilon.—Additions to the faculty are Harold Sheinaus, in pharmacy; David Buchsbaum, in mathematics; and Richard Heffner, in contemporary civilization.

**University of Connecticut.**—On November 15, thirty graduates, who in their undergraduate days were members of the Curtis P. Gladding Honor Society, were initiated into Alpha Gamma Chapter of Rho Chi as alumni members. One senior was initiated as an active member.—Eight new members were initiated by Lambda Kappa Sigma sorority in November.

**University of Florida.**—The new infirmary pharmacy was opened in the University's infirmary in September. It is in charge of two registered pharmacists who are taking graduate work in pharmacy. Senior students in the dispensing class are now receiving training in the hospital pharmacy.—In observance of Pharmacy Week, President Powell spoke over the radio on the subject "Behind the Scenes of Your Local Pharmacy". A state wide news release with photographs was handled through the University's publicity department. The campus newspaper published an article on Pharmacy Week and several displays were set up on the campus.—Three new campus buildings, the administrative building, the student service center, and Reid Hall, a women's dormitory, were dedicated in November.

**George Washington University.**—Dr. Raymond Kinsey, recently retired as pharmacist director of the U.S. Public Health Service, has established a \$400 scholarship to provide aid to a freshman or a sophomore student.—Dr. Morizo Ishidate, professor of pharmacy, University of Tokyo, who was an October visitor, is visiting the United States through the auspices of the Office of the Supreme Commander for Allied Powers as a part of the Reorganization Program for Japanese National Leaders.—Dr. Boyer, of the Lederle Laboratories, spoke on aureomycin recently before the student branch.—A new dispensing laboratory, equipped with the latest features in dispensing desks and wall cabinets, is being established for occupancy with the beginning of the second semester.—Dr. Schermerhorn presided at the meeting of delegates of Kappa Psi of Province III held at Charleston, South Carolina, in December.—Paul Bay, of the June graduating class, is taking graduate work in pharmaceutical chemistry at the University of Minnesota, and Sidney Futterman and Dominic Filicetti, of the same class, are pursuing graduate studies in biochemistry at George Washington University.—Dean Charles W. Bliven served as a delegate for the A.A.C.P. at the National Drug Trade Conference held in Washington on December 1.—Dr. S. J. Greco addressed the December meeting of the Washington branch of the A.Ph.A. on "Recent Developments in Dispensing Pharmacy".—The departmental library has been remodeled to provide additional space for reference books and journals.

**University of Georgia.**—Dr. and Mrs. W. R. Byrum and Robert Styles accompanied the junior and senior classes on a visit to Parke-



Davis and the Upjohn plants recently. The students' reaction to this trip was that it had great educational value. They gained a better knowledge concerning the vast amount of research, development, investigation and production planning that enter into the manufacture of products sold in the drug store. It will enable them to dispense these products with confidence when they know the care that is taken to make them of the finest quality.—The second annual pharmacy seminar for Georgia pharmacists, sponsored by the School of Pharmacy, the Georgia Pharmaceutical Association, and the Division of General Extension of the University, was held on November 8 and 9, on the Athens campus. The subject of the seminar was Drug Store Business, with special emphasis being given to current trends in the drug field. The chief speaker of the occasion was Dr. Allen Bunce, M.D., president of the U.S.P. Convention. Other participants in the program besides the faculty were William Volk, manager of the Atlanta Economy Drug Company, and Rease Inge, southern division manager of the E. R. Squibb and Sons.

**Howard College, Birmingham.**—Thirty-one students, juniors and seniors, made an education trip to the Parke, Davis Company plant recently.—Mr. Emil Cermak, a retired druggist, formerly of Omaha, Nebraska, has presented the library with a copy of *The Pharmacopoeia Austriae-Provincialis* which is written in Latin and printed in Vienna in 1794.—Owen L. Crutcher, instructor in pharmacy and drug store management, attended Georgia's Second Annual Seminar in November. The theme discussed was "Unnecessary Losses in the Retail Drug Store".—An all-day pharmacy seminar was held at the college on November 9. The chief speakers were Prof. George Hargreaves of the Alabama Polytechnic Institute and T. W. McGeever of Atlanta, federal narcotic supervisor and E. T. Gullledge, local drug administrator.—85% of the student body are members of the local A.Ph.A. branch.

**University of Illinois.**—Ralph A. Carpenter and Thomas G. Crawford, director of personnel for the Walgreen Drug Company, have been appointed by the Board of Trustees to the University of Illinois Advisory Committee of the College of Pharmacy.—Several fellowships are available for scholars who contemplate academic careers in pharmacy. The stipend is \$1,200 for the calendar year. Exemption from tuition fees is provided for all appointees. Registration for M.S. or Ph.D. degrees is required. Evidence of scholarship and promise of research ability are primary considerations. Applications must be received by February 15, with selection to be announced by April 1, 1951. Forms may be obtained from the Associate Dean of the Graduate College, University of Illinois, 808 S. Wood St., Chicago 12, Illinois.

**The State University of Iowa.**—Edward S. Rose, class of 1904, and operator of a professional pharmacy in Iowa City, has established a \$25

cash prize to be awarded to the student making the highest grade in manufacturing pharmacy.—Dean R. A. Kuever, in November addressed the Scott County Medical Society and the Scott County Pharmaceutical Association on the topic, "Prescribing and Dispensing Rules and Regulation".—In November, Dr. Albert P. McKee of the department of bacteriology of the medical school spoke to the student branch on "Recent Advances in Influenza Research".—The Hospital Pharmacy, which is a teaching unit for the college of pharmacy and which serves all the university hospitals, has been extensively remodeled to provide more efficiency in the service rendered.

**University of Kansas.**—The first annual institute of the Kansas Pharmaceutical Association, which is sponsored by the Association, the school of pharmacy and the extension division of the University, was held at the University on October 23, 24, and 25. Sixty-two Kansas pharmacists attended. Several members of the pharmacy faculty participated. Other members of the general University faculty that took part were Chancellor Deane W. Malott; Dr. Edward H. Hashinger, professor of medicine and director of postgraduate medicine; E. C. Buehler, professor of speech and forensics; Fred Sharpe, of the Kansas University Extension Division; and E. A. McFarland, manager, Lawrence Center, University Extension Division.—C. J. Patterson, 40, has been elected chairman of the board of trustees of the Midwest Research Institute of Kansas City, Missouri.—Dean J. Allen Reese, on November 20, spoke to the members of the Williston Club, an exclusive research group at the University, on "The Development of Legal Standards for Drugs".—Dr. J. H. Burckhalter gave an illustrated lecture at the October meeting of Sigma Xi on "The Development of a New Drug", in which he discussed Camoquin, the new antimalarial which he synthesized while a member of the research staff of Parke, Davis & Company.—The two sons of the late Dean Emeritus L. D. Havenhill have presented to the University their father's valuable historical library and collection of pharmaceutical and medical antiques. These represent more than forty years of collecting and include one of the most complete mortar collections in the United States. The books and items are now being evaluated and catalogued.

**University of Kansas City.**—Dean T. T. Dittnich addressed the University circle at the November meeting on the subject, "Medical Progress in the Past Fifty Years".—About 125 students attended the various sections of the Sales Training Program sponsored by the McKesson Robbins Company on November 21 and 22. Dr. Gardner directed the well planned program.—The alumni association and the student body co-operated in celebrating National Pharmacy Week. A drama, "The Prescription that Shook the World" was presented over Station WHB on October 29, and members of both groups appeared on four other radio

programs and a television broadcast.—Mr. Mars Westzberger of the school of pharmacy was recently presented as the "Man of the Year" by the University alumni association.—The seventh annual pharmacy seminar sponsored by the alumni association was held on November 16. More than 300 druggists attended the excellently planned program.—Dr. W. M. Hoehn spoke before the Phi Sigma Biological society at Lawrence, Kansas, on December 11, his subject being, "Some Investigations of Possible Anti-Tumor Agents".

**Loyola University.**—The University is completing a \$10,000 faculty research laboratory for pharmacy. It was designed and arranged by the Fisher Company and is one of the finest research laboratories in the south.—A new manufacturing laboratory in charge of Mr. C. L. Bradley, is now functioning.—Miss Elinor McCloskey, daughter of Dean John F. McCloskey is enrolled in the freshman class in pharmacy.—Dr. Edward J. Ireland was called as an expert witness in toxicology and pharmacology in November on the famous weeks long Quartararo trial in New Orleans.—The Historical Pharmacy Museum in the old French Quarter of New Orleans, which is supervised by the Loyola College of Pharmacy, was dedicated on October 19. This culminated seventeen years of collecting and developing the historical phases of the Museum by Dr. Ireland and Dean McCloskey and a countless number of students who assisted them. Over 900 visitors a month have been inspecting the Museum. It is one of the finest contributions to pharmacy in Louisiana and in the south.

**Massachusetts College of Pharmacy.**—At the annual meeting of the Corporation, John R. Sawyer, Ralph R. Patch, and Hart Harris, Jr., were elected to the Board of Trustees. Wilfred Chagnon was elected a Trustee of Funds to fill the unexpired term of Irving P. Gammon, who retired after fifty years of service. Samuel M. Best was elected president of the College by the reorganized Board of Trustees.—The following new faculty additions have been made: Fred Elmadjian, Ph.D., a staff member of Worcester Foundation for Experimental Biology, Research Associate at Tufts Medical School and at Worcester State Hospital, appointed as lecturer and research associate in biology. He will conduct graduate courses in endocrinology. John T. Murphy, chief pharmacist of the Massachusetts General Hospital and past-president of the Massachusetts Society of Hospital Pharmacists, appointed as consultant in hospital pharmacy. He will assist in the development of graduate courses in hospital pharmacy. James Mickles, M.S., formerly instructor in chemistry at Purdue and at one time engaged in development research for the National Research Council at Columbia University, appointed as instructor in chemistry. Randall B. Tinker, a graduate of this and Bowdoin College who has held positions as chemist with the Chalco Division of the American Cyanamid Company and the General Electric Com-

pany, and George Narinian, a former graduate fellow in this school who received the M.S., in 1950, are newly appointed assistants in pharmacy. Dr. Raymond W. Vander Wyk, an instructor on the faculty for several years and who was awarded the Ph.D., with botany as a major at Harvard University last year, has been promoted to the rank of assistant professor of pharmacognosy and biology. Raymond A. Gosse- lin has been promoted to the rank of instructor in economics and business administration.—Prof. Heber W. Youngken, Sr., and Leslie M. Ohmart have been elected as chairmen of the Committee on Pharmacognosy, and associate chairman of the Committee on External Preparations and a member of the Committee on Internal Preparations, respectively, of a member of the Executive Committee of the American Foundation for the U.S.P. Revision Committee.—Dean H. C. Newton has been elected a member of the Executive Committee of the American Foundation for Pharmaceutical Education.—The laboratory and equipment fund campaign, celebrating the 125th anniversary of the founding of the school, is nearing completion, over \$92,000 of the \$125,000 goal having been subscribed.—The new pharmaceutical laboratory accommodating 28 students and designed to offer the maximum in teaching efficiency was completed during the summer of 1950.—Supplementing its annual refresher course in May, the school offers a briefer refresher course on a regional basis for those who find it difficult or impossible to attend the annual course. Such a course was given for the members of the Southwestern Massachusetts Druggists Association early in November.

**University of Minnesota.**—A Llyod Extractor has been added to the equipment.—417 undergraduates and 21 graduate students registered at the beginning of the fall quarter.—Drs. E. C. Elliott and R. Deno addressed the students on November 27, while making a tour of inspection.—Major L. P. Zagelow, U.S.A.F. (M.S.C.), assistant professor of military science and tactics, in charge of the Pharmacy R.O.T.C. unit, was recently promoted to the rank of Lieutenant Colonel.—Four seniors were initiated into Phi Lambda Upsilon in December.—Prof. L. D. Small of the University of Nebraska was a campus visitor in August.—Teaching assistants added to the staff this year are Paul G. Bay, Grant Fag, Robert Appel, Chao-Chia Chou, Arthur Johnson, and George R. Berttula.—Del D. Turner, a laboratory instructor in the department of pharmacy for many years, died at his home in St. Paul on December 4, 1950, at the age of 88.

**University of Mississippi.**—John D. Bethany, a senior pharmacy student, is one of a group of seventeen men initiated in December into Omicron Delta Kappa, national honorary leadership fraternity. This is considered one of the highest honors on the university campus, and constitutes recognition of leadership in scholarship, religion, athletics,

journalism or the forensic arts.—At the December meeting of the student branch, the Parke, Davis film "Oxyel in Surgery" was shown.

**University of Nebraska.**—The student branch observed Pharmacy Week by installing a special display in a down town prescription pharmacy which featured the cooperation of medicine, pharmacy, nursing, research, and public health in combating heart disease.—A radio broadcast was conducted also by Dean Burt and Leland C. Lucke, president of the student branch.—The student branch has enrolled in its membership 75% of the total student enrollment.—Studies now being conducted by the staff and graduate students include the preparation of a special medium from chick embryo extract which may be used for the growth of tissue cells *in vivo*; a study to determine the possible effect glutathione of cysteine in counteracting cyanide toxicity in the turtle's heart; a study of the possible sources of energy for sperm motility; and the use of a new circular type of Warburg apparatus as an aid in the study of normal and inhibited respiration in protozoa.—A high pressure hydrogenation apparatus has been added to the research equipment in the pharmaceutical chemical laboratory.—Wallace W. Wimberly who has been on the staff for the last three years, has resigned to accept a position with the Abbott Laboratories.

**University of New Mexico.**—In November, Dean R. A. Bowers spoke before three county medical societies on "Pending Federal Legislation Regarding the Writing and the Filling of Prescriptions".—Several members of the pharmacy staff have been named on general committees of the university. Dean Bowers is serving on the administrative and entrance and credits committee; Prof. Hocking, on the committee on policy and on university aims and objectives; and Prof. Castle, on the curricula committee and on the board of the division of research and development.—David B. Cox is the recipient of the \$1700 fellowship of the Upjohn Company which was first granted last year.—Dean Bowers has again been reelected national secretary-treasurer of the Rho Chi Society.—President F. A. Andrews of a Denver drug firm, has recently made a gift of \$150 to the pharmacy scholarship fund.—Dean Bowers is chairman of a state legislative committee which is proposing a number of changes in the state pharmacy law to render it more effective. Discussions are also being made relative to the formulation of a state food and drug law.—Instructor Frances I. Blair attended the Cleveland meeting of the American Association for the Advancement of Science in December.—Miss Blair has been appointed instructor trainer for Bernalillo county by the American Red Cross. She will take the place of instructors ordinarily sent out from the St. Louis office of the Red Cross.—Prof. George Hocking is applying audio-visual methods to his course work particularly in pharmacology. The laboratory work is supplemented by films or film slides which portray the use of drugs in complicated

pharmacological set-ups, in clinics and in surgical operating rooms. In this way, the student has access to much information otherwise not readily available to him.—A new million dollar class room is now under construction which when completed will make available room greatly needed for laboratory purposes in the pharmacy building.

**University of North Carolina.**—The Division of Health Affairs completed its first year of operation on June 1. The Division, consisting of the schools of dentistry, medicine, nursing, pharmacy and public health and of the university hospital, is a new endeavor of the North Carolina legislature toward the centralization of its health responsibilities. The Division has published its first progress report, entitled, "After 71 years".—Drs. Richard A. Deno and Edward C. Elliott spoke to a fully attended convocation of the pharmacy student body during their accreditation inspection in September.—Dr. Fred Semenluk has been promoted to the rank of associate professor of pharmaceutical chemistry.—Mr. Norman Taylor, of the Cinchona Products Institute, Inc., addressed the student body recently on, "Recent Developments in Cinchona and Its Alkaloids".—Xi Chapter of Rho Chi is scheduling a series of monthly supper meetings for the school year, each of them supported by an invited speaker. The chapter initiated three students recently. Stephen Perrow received the Rho Chi freshman scholarship award.—Mr. W. C. Sugg, district sales manager for the Upjohn Co., addressed the N.C.P.A. student branch on, "Selling as a Career". The student branch has a voluntary 100% membership from the student body.—Dean E. A. Brecht recently made the following addresses: to the dental staff of Rex Hospital, Raleigh, on, "Pharmaceutical Services to Dentistry"; to the Greensboro Drug Club and to the Regional Meeting of Pharmacists, Charlotte, on, "The School of Pharmacy: Problems and Plans"; and to the Lions Club of Albemarle, on, "New Drugs and Their Development".—An oil portrait of the late Dean M. L. Jacobs was presented to the school by the 1949-50 student body at a ceremony attended by many pharmacists and friends from over the state. The portrait is hung in the school library together with those of the former Deans E. V. Howell and J. Grover Beard.—Dr. Fred Semenluk presented a paper before the Elisha Mitchell Scientific Society on, "Instability Characteristics of 1-Haloalkyl Esters", based upon recent research in collaboration with William D. Cash.—Kappa Psi presented "All Quiet on the Narcotic Front", as one of a series of competitive skits for the student branch programs by various student body organizations.

**Temple University.**—Registration in pharmacy for the fall semester was 407, of which 104 were freshman and 14 were graduate students enrolled for the master's degree.—The program for the Freshman Day consisted of a tour of the dental-pharmacy building and instruction in the rules governing conduct, grading, and promotions.—Dr. Ernest Little,



at a recent convocation, presented Fellowship awards in behalf of the American Foundation for Pharmaceutical Education to three graduate students.—Mr. Arthur Vandergrift presented the Breyer Fellowship to Arnold Gessel who was selected as the entering freshman who presented the best high school record.—Dr. Martin Barr, an alumnus of Temple and now assistant professor of pharmacy at the Philadelphia College of Pharmacy and Science, recently discussed the organization and requirements for the Medical Service Corps, before a joint meeting of the two colleges which was sponsored by the student branches.—The fiftieth anniversary of the school of pharmacy will be celebrated on April 11 by a formal convocation, an educational symposium and the dedication of a model pharmacy which is now under construction. A group of America's most distinguished scientists and pharmacists will take part in the program.—Dean Sprowls has been appointed chairman of the Science Day program, a high school guidance program which is held each year by the Temple University chapter of Sigma Xi.—Dr. James C. Munch spoke on the subject "The Meaning of Drug Safety" in January before the New York City branch of the American Pharmaceutical Association.—An innovation in the graduate curriculum is a seminar course dealing with orientation in graduate study. Attendance is required of all graduate students. Lectures are given by staff members and by selected representatives from industry and deal with such topics as "Planning the Research Problems, Personal Demands for Research in the Drug Industry, The Use of Statistics in Research and Proper Use of the Library". The lectures follow a logical sequence submitted by Dr. Albert N. Martin and adopted by the Committee on Graduate Study. The course carries a minimum of credit and is offered primarily as a help to the student in planning his graduate program and his thesis problem.

**University of Tennessee.**—Fifty students were graduated on December 18. The commencement address was delivered by Dr. J. P. Gray, medical consultant, Parke, Davis and Company.—Rho Chi has initiated 18 members of the senior class.—The fall quarter began with a total of 78 new students, 25 of whom are veterans and 4 are women.—Dr. Albert H. Musick visited the College of Pharmacy of the University of North Carolina, the Medical College of the State of Virginia, the Massachusetts College of Pharmacy, and twelve pharmaceutical houses in New Jersey and New York during June and July.—Dean R. L. Crowe attended the Phi Delta Chi national convention in Detroit in November.—A complete set of Tschirch's "*Handbuch de Pharmacognosie*" has been added to the library.—A Spencer research type stereoscopic binocular microscope has been acquired by the Division of Pharmacognosy.—Instructor Howard Hassler is on leave and C. B. Nash, a recent graduate are both at Purdue for graduate work.—Howard Johnson Schramm, Jr., A.B., Hiram College, A.M., Duke University, became instructor in botany on September 1, 1950. He served in the army in the European area from

Mach 1941 to April 1946 and was discharged with rank of first lieutenant.

**University of Texas.**—Dr. Fred Lofgren visited the St. Louis College of Pharmacy in December to inspect the equipment and facilities in use there in the manufacturing laboratory.—Dr. S. G. Mittelstaedt attended a special course dealing with the medical aspects of special weapons and nuclear isotopes held at the Naval Medical Center, Bethesda, Maryland, during one week in December.—Dr. W. R. Lloyd represented his alma mater, the University of Colorado, at the recent installation of the new president of Southwestern University at Georgetown, Texas.—Dr. C. C. Albers attended a meeting of the board of education of his church in Washington, D. C., December 5-6. He was also the featured speaker at a banquet in Galveston on November 9, commemorating the founding of the First Lutheran Church in that city.—The skeleton of the new pharmacy building is nearing completion and plans are laid to occupy it at the beginning of the next fall term.—The school has received \$18,600 in grants this year for research on plant drugs and antibiotics. Of this amount \$15,000 is a grant from the Clayton Foundation, formerly of Houston, and will be paid over a period of three years. The remaining \$3,600 is from Sharpe & Dohme and is to be used in the investigation of a genus of fungi for its antibiotic properties. The studies will be supervised by Dean Burlage and by the Biochemical Institute, of which Dr. Roger Williams is director.—Two pharmacy students, Jack Pippin and Bob Gude, have been elected to the University Assembly Branch of University Government.—A student council within the college has been organized from representatives of the various student organizations for the purpose of coordinating the extra-curricular activities of the groups.

**University of Utah.**—The student branch program of November 15, consisted of a discussion lead by Dr. Broadbent, chairman of the campus committee for student deferment. A representative of each branch of the armed forces was present and answered questions asked by the students concerning the status of students in the service.

**Medical College of Virginia, School of Pharmacy.**—Drs. Elliott and Deno, assisted by Mr. Howard Whitehead, president of the Virginia board of pharmacy, inspected the school in September on behalf of the American Council on Pharmaceutical Education.—Dean Brecht and Dr. Thompson of the University of North Carolina visited the school recently to observe the hospital pharmacy and its relation to the school of pharmacy. Also Dean Hayman and Dr. Marsh of West Virginia University were recent visitors to study the program in the department of pharmacology.—The members of the junior and senior classes were guests of the American Pharmaceutical Association at the formal instal-

lation ceremonies which marked the opening of the Pasteur-Galt Colonial Pharmacy at Williamsburg, Virginia.—The National Research Council has named Dean R. B. Smith, Jr., a member of the Committee on Food Protection.—Dean F. Byers Miller of the University of Richmond, School of Business Administration, has been appointed professor of pharmaceutical administration in the school of pharmacy. Dean Miller has conducted studies in drug marketing at Ohio State University.—Mr. Peter Bogarosh, formerly with the University of Buffalo, has been appointed as instructor in pharmacognosy and is also pursuing graduate work leading to the doctorate in pharmacology.—Mr. Ralph Tedescki, an alumnus of Rutgers is an American Foundation Fellow, majoring in pharmacology.

**Ohio State University.**—Dean B. V. Christensen attended a meeting of the A.Ph.A. Council in Washington, D. C., in September at which time problems confronting pharmaceutical education and the pharmaceutical profession in relation to national defense were discussed.—Dean Christensen spoke on the subject "Pharmacy on the March" before the student branch of the Cincinnati College of Pharmacy on November 1.—Dean Christensen and Drs. Guth and Nelson read papers before the pharmacy subsection meeting of the A.A.A.S. at Cleveland in December.—Dr. Lloyd E. Harris who has been on active duty with the U.S. Army at Atterbury, Indiana, since September 21, was granted a six months delay in call and returned to his departmental duties on November 13.—Two students were granted the doctorate at the December 22nd convocation. One of them, Dr. Arthur Tye, has been appointed assistant professor of pharmacy and will serve on the faculty the winter and spring quarters.—Dr. John A. Biles, B.S., Ph.D., University of Colorado and formerly with Midwestern University, Wichita Falls, Texas, joined the pharmacy staff at the beginning of the autumn quarter.—Col. Byron L. Steger, M.C., Assistant Chief, Education and Training Division, office of the Surgeon General, Washington, inspected the Pharmacy ROTC unit in November and approved the progress being made. Col. C. F. Goriup, MSC, Chief, Medical Service Corps, office of the Surgeon General, also inspected the unit on December 8.—New equipment includes a large mechanical Freeze-Dryer and an Ultrasonic Generator.

**Oregon State College.**—The fifth annual seminar which is sponsored by the school and the Oregon board of pharmacy, was held on January 12, the main theme being "Prescription Refills—Where Do We Stand?" Prof. H. C. Forsland, instructor in pharmaceutical law, reviewed the interpretations and legal decisions that have come out of the Food, Drug and Cosmetic Act. Mr. L. L. Riggs, president of the Oregon branch of the A.Ph.A. discussed the Association's position on refills and Prof. Fred Grill spoke on the N.A.R.O.'s proposal regarding refills. President W. Z. Dickson of the Oregon board moderated a closing panel discus-

sion.—Dr. J. M. Boyer, prominent physician of Eugene, spoke to the student branch in December on "The Relationship of the Pharmacist to the Practice of Medicine".—Prof. Grill represented the school at the annual meeting of the Oregon State Medical Society at Gearhart in September and supervised a display, which was sponsored by the school, concerning the legal responsibilities of the pharmacist in regard to federal and state regulations for pure drugs.

**Philadelphia College of Pharmacy and Science.**—The college has been made the beneficiary of the residual estate of Cora M. Myers, widow of William H. Myers, class of 1895, who died in 1937. The legacy, amounting to approximately \$23,000, has been placed in the endowment fund.—At a student assembly on November 30, 18 undergraduate scholarships were awarded. President Henry H. Gregg of the A.Ph.A. was the chief speaker on the occasion.—New courses have been added in biometrics and in the chemistry of natural products.—The new LaWall Memorial Laboratory of biochemistry and pharmacology is now functioning on a full class schedule and several new courses in pharmacology have been added to the curriculum.—A complete microfilm service, made possible by the Raser Library Fund, has been installed by the library. This equipment can prepare standard microfilm recordings of manuscript, book pages, and other documents, and can project enlargements of these and other microfilms for easy reading.

**University of Pittsburgh.**—The Alpha Omicron Chapter of Rho Chi was installed on November 21, 1950, following a candlelight dinner at the faculty club of the university. Dr. George D. Beal, assistant director of the Mellon Institute for Industrial Research, was the installing officer. He was assisted by Dr. Edward P. Claus of the university faculty. Thirty-four active and alumni members, graduate assistants, graduates of the 1950 class and undergraduates of the class of 1951 were initiated. There were 14 in the faculty and graduate assistant group and 20 alumni and students. Dr. Beal was also the principal speaker on the occasion. His subject, "The Significance of Honor Societies", compared the qualities of scholarship and fellowship of members of Rho Chi with the qualities of drugs of the United States Pharmacopoeia and indicated that only the best representatives were selected in each case. Following the presentation of keys and certificates, the following persons spoke briefly: Dean Edward C. Reif on behalf of the faculty, Mr. Allan J. Rudner on behalf of the students, and Mr. W. L. Blockstein on behalf of the alumni. Chancellor R. H. Fitzgerald, who was to speak in behalf of the university, was unavoidably detained. His place was taken by Mr. Lester Brailey, assistant to the dean of men. He stated that the university welcomed the Alpha Omicron Chapter of Rho Chi to the campus and that it is the thirteenth representative of American college honor societies at the University of Pittsburgh. A number of distinguished guests from

other school and pharmaceutical organizations were present. After the ceremony, at a business meeting, Dr. John H. Wurdack, professor of chemistry at the school was elected president of the chapter. All the other officers chosen are senior students.

**Purdue University.**—Dr. T. Kaeliyone, immediate past-president of the Japan Pharmaceutical Association and professor of pharmacognosy at the University of Kyoto, spent two days, recently, on the Purdue campus examining the equipment and educational program of the pharmacy school.—Prof. John E. Christian organized a one day chemical colloquium which was held on the campus in September. 350 chemists and related scientific workers from Indiana were in attendance and 18 exhibitors displayed recent and new equipment.—The school in cooperation with the Extension Division and the General Electric X-ray Corporation, conducted two basic courses in radiographic procedures during September. The courses were given under the supervision of Dr. H. George DeKay.—Mr. Ned R. Wolfe a graduate in radiologic technology from St. Louis University, has been appointed x-ray technician with rank of instructor.

**Rutgers University.**—Dr. Ernest Little has been honored recently by Governor Driscoll and the New Jersey State Legislature as one of New Jersey's outstanding citizens.—Dean Thomas D. Rowe has resigned, effective June 30, to accept the deanship of the college of pharmacy of the University of Michigan.—The Northern New Jersey Branch of the A.Ph.A. has been addressed recently by Dr. R. P. Fischella on "Pharmacy and National Affairs", and by Mr. Royce Franzoni on "The Pharmacy Mission to Japan".—An annual seminar has again been planned for the pharmacists of New Jersey for the month of March and will be presented on successive Wednesday.—The student branch has been addressed recently by Mr. Robert A. Hardt of the Hoffman-LaRoche Company on "Trends in the Prescription Department", and by Mr. Louis Kazin of the Rutgers University Pharmaceutical Extension Service on "Your Stake in the American Pharmaceutical Association".—The Pharmaceutical Extension Service has planned to conduct a series of refresher type programs for pharmacists in ten different sections of the state which will offer an unparalleled opportunity to keep the pharmacists in touch with the very latest in pharmaceutical developments.—Under the sponsorship of Rho Chi Society, Mr. E. F. Woodward of S. B. Penick and Company, gave a most informative lecture with kodachrome slides of his recent expedition to Africa in the search for raw materials containing possible intermediates for the synthesis of cortisone.

**Southern College of Pharmacy, Inc.**—Mrs. M. Q. Brackett who had her training at the East Tennessee State Teachers College and the Georgia State College for Women, has been appointed librarian.—Prof.

A. G. Morgenthales attended the pharmacy seminar held in November at the School of Pharmacy of the University of Georgia. Prof. Morgenthales has organized a basketball team which has a complete schedule for the season.—Prof. J. N. Sedar accompanied 65 students on a tour of the Parke, Davis and the Lilly plants in November.

**The Medical College of the State of South Carolina, School of Pharmacy.**—Several members of the local chapter of Phi Delta Chi attended the Grand Council meeting at Detroit in November. The local chapter has organized a fraternity house at 254 Calhoun Street.—The members of the local chapter of Kappa Psi were hosts to a province meeting on December 2. Dr. Neuroth of the Medical College of Virginia and Dr. Fred Semeniuk of the University of North Carolina were faculty representatives from their institutions. School sending student delegates were, George Washington University, the Medical College of Virginia, and the Universities of North Carolina and Florida. Fifty members attended the session.

**Wayne University.**—Dr. Simon Benson, a former member of the staff, has been transferred to the division of student health services.—The following appointments have been made: Dr. Frederick Waterman, Ph.D., Ohio State, formerly research physiologist and pharmacologist for the Frederick Stearns Company and at one time instructor in pharmacology in Georgetown University, to teach courses in pharmacology; Prof. Glafkides, a graduate of the University of California, to teach human physiology; Mr. H. A. K. Whitney, full time faculty member is stationed at the Detroit Receiving Hospital where he has charge of all the pharmacies and of the instruction in hospital pharmacy (a limited number of pharmacy internships for pharmacy graduates have been provided); the courses formerly grouped under pharmaceutical economics have been extended and re-organized under the title of pharmacy administration and placed in charge of Prof. R. J. Hill, B.S. in Pharm., L.L.B., Reg. Ph. The courses included in this group are marketing of medicinal products, management of retail drug stores, pharmaceutical accounting, pharmaceutical jurisprudence, and pharmaceutical commercial orientation.—Since 1946 the freshman class has been limited to 64 students and enrollment occurs but once a year (September). Nearly all in the present freshman class have had one or more years of arts and science training.—A new laboratory has been provided for operative pharmacy.

**State College of Washington.**—Drs. Elliott and Deno, assisted by Mr. Bert Densow, secretary of the Washington board of pharmacy, inspected the school on December 8 and 9.—Three senior students were initiated into Rho Chi. Mr. E. R. Coar, of the Abbott Laboratories, spoke on the occasion, his topic being, "Radioactive Medicine".—Mr. Claude



Edgren, president of the Washington State Pharmaceutical Association, spoke recently before the student branch.

**University of Washington.**—Drs. Elliott and Deno and Mr. C. R. Halverson, inspected the school for the American Council on Pharmaceutical Education on December 11 and 12.—Dr. Walter Neuman has been appointed supervisor of the medicinal plant garden, succeeding the late Mr. Ludwig Metzger who capably had managed the garden for a quarter of a century.—New laboratories have been completed for advanced pharmaceutical chemistry and for the course in cosmetic manufacturing. Dr. Robert Miller is giving a new course in plant chemistry dealing entirely with alkaloids, and Richard Kerr is teaching a new pharmacy course designed especially for dental hygienists.—Rho Chi has recently pledged sixteen new members.—E. R. Hammerlund, a graduate student in pharmacy, has been elected a full member in Sigma Xi, and Stephen Sim, an associate member.—Joy Bickmore, teaching fellow in pharmacy, has been initiated into Lambda Kappa Sigma.—Dr. Heber Youngken, Jr., addressed the Pierce County Retail Druggists' Association in December on "Anti-Arthritic Drugs" with particular emphasis on Cortosone and ACTH.—A new text, **Principles of Pharmacognosy**, by Pratt and Youngken, Jr., will be off the press in March or April.

**University of Wisconsin.**—A new research project on dosage forms for Steroids to be directed by Dr. Louis W. Busse, has been established with the aid of a \$1,500 grant from the Chemical Specialties Co. of New York.—A fellowship of \$1,200 awarded by the National Cranberry Association, will be used for studies of ursolic acid, under Dr. Lloyd M. Parks.—Undergraduates have begun the publication of a school paper.—"The Future of Pharmacy" was the subject of an address before the students by Jennings Murphy, state association secretary, at a meeting of the University Pharmaceutical Society in November.—Rho Chi has announced Miss Elaine Hawley as the recipient of its award to the "outstanding freshman".—Prof. Dale E. Worster has been elected Grand Ritualist of Kappa Psi national fraternity.—Prof. George Urdang has been named an honorary member of the Peruvian Society for the History of Pharmacy and asked to participate in the Second Pan-American Congress of Pharmacy to be held in Lima next year. Last October, Dr. Urdang participated in the dedication of a restoration of Louis Ruffillo's historic pharmacy in the French Quarter of New Orleans, at the invitation of Loyola University faculty; while there his name was added to the roster of "honorary citizens" of New Orleans.—The school and the pharmacy at Wisconsin General Hospital were joint hosts to the meeting of the Wisconsin Hospital Pharmacists Association at which Profs. Busse and Wurster presented a discussion-demonstration on ointment bases.

**University of Wyoming.**—Dean David W. O'Day is the president-elect of the Wyoming Section of the American Chemical Society for the coming year.—Dr. T. O. King, department of pharmacology, was the delegate from the Wyoming chapter of Sigma Xi to the Cleveland meeting and while there attended the annual meetings of the American Association for the Advancement of Science.—A new type Beckman Spectrophotometer has been added to the laboratory equipment for advanced pharmaceutical chemistry.

**Xavier University.**—The student branch of the A.Ph.A. received its charter on September 16, 1950.—The Tau Chapter of Chi Delta Mu was installed on May 31, 1950. The purpose of the fraternity is to unite the men who are engaged in the study of dentistry, medicine, and pharmacy and those who are already practicing. It was founded at Howard University Medical School in Washington, D. C., in 1913.—A coordinated program in training student apprentices has been set up with the drug store proprietors of the city. The purpose of the program is to train the students in the essential phases of practical drug store operation. The student apprentices were guests of the New Orleans Progressive Druggists Association at the October meeting. Movies on drug store merchandising were shown after which a round table discussion was held.—Mr. Joseph A. Azemard, instructor in pharmacognosy and pharmacology, took advanced courses at the University of Southern California this past summer.—Recent appointments to the faculty and staff include Sister Mary Veronica, instructor in pharmacy; Miss Jacqueline Venet, instructor in chemistry; and Miss Regina Rodney, secretary to Dean Ferring.—The department of pharmacology has purchased several banks of individual removable animal cages of the latest design, thereby assuring adequate care of animals for experimental purposes. The department has also brooked a series of films dealing with the therapeutic uses and effect of drugs, for showing throughout the year.—Six Hellige-Dubosc colorimeters, a Fisher Electrophotometer and a Beckman Quartz Spectrophotometer have been added to the equipment of the chemistry and the pharmaceutical chemistry departments.

## Miscellaneous Items of Interest

Dr. Edwin Leigh Newcomb  
and

### The American Foundation for Pharmaceutical Education\*

ERNEST LITTLE

Acting Secretary of the American Foundation for  
Pharmaceutical Education

September 1, 1950 was a busy day in the life of Dr. Edwin Leigh Newcomb.

There was much to be done in preparation for the long Labor Day weekend, and Dr. Newcomb was not one to leave a great deal of unfinished business on his desk for any considerable period of time, and so he worked hard, harder than usual—maybe too hard. But he finished his work, and was in a happy mood, in anticipation of a long weekend—a long weekend with his family and his roses. Roses which are still blooming and which still show the effects of his gentle care.

He had planned on leaving his office a little early, but his departure was delayed a bit by a distressed feeling in his chest. "It didn't amount to much", as he said to his son Allen, "I walked it off". I think if the truth were known we would learn that Dr. Newcomb had "walked off" similar feelings on more than one occasion when he had worked especially hard in order that no unfinished business should be left on his desk.

Dr. Newcomb left his office that September day feeling well and in an unusually happy frame of mind—unusual even for him. There

\* This address was made on December 4, 1950, on the occasion of the posthumous presentation of the Remington Medal of Honor of the late beloved Edwin Leigh Newcomb. The presentation was made in the Harkness Theatre—Butler Library of Columbia University in the City of New York. Mr. Charles H. Soren, president of the New York Branch of the American Pharmaceutical Association was chairman on the occasion. Rev. Darby W. Betts, assistant chaplain of Columbia University gave the invocation. Other speakers were Dr. John W. Dargavel, executive secretary of the National Association of Retail Druggists; Dr. Ivor Griffith, president of the Philadelphia College of Pharmacy and Science; and Dr. Theodore G. Klumpp, president of Winthrop-Stearns, Inc. Dr. Curt P. Wimmer, emeritus professor of pharmacy, Columbia University and editor of the New York State Pharmacist made the medal presentation. Dr. Wimmer's citation follows Dr. Little's address.—Ed.

was the usual cheerful smile, the wave of the hand and "Have a good weekend", as he left his office for the last time.

About three weeks ago, while working in his office, I noticed one of his staff members standing quietly and looking intently at a framed picture of Dr. Newcomb, which had been placed there only a few days before. I commented that the picture was unusually good, and I shall not soon forget the young lady's reply, as she said, "Gee, he was a swell guy, I liked to work for him". I made no reply but I reflected for some time and thought, what finer compliment could be paid any man than to have a member of his office staff spontaneously and with great sincerity remark, "He was a swell guy, I liked to work for him". You may have your more elegant expressions, I am certain Dr. Newcomb would prefer that one.

In case some of you older people feel that such an expression is a little too informal for an occasion such as this—I had better explain to you what we members of the younger generation mean when we say, "He was a Swell Guy". We mean in the first place that he was simple, simple in the sense of being uninvolved. He was direct, four square, unselfish, interested in the other fellow and eager to extend a helping hand wherever possible. Dr. Newcomb possessed these qualities and characteristics. I bespeak your understanding tolerance when we refer to Dr. Edwin Leigh Newcomb as a "Swell Guy". He was just that.

That evening, a matter of hours, after arriving home, Dr. Newcomb passed away. A really great man left American pharmacy, and a great void exists in many places—many challenges remain for us to meet—as a result of his departure.

During the past two months I have had occasion to read copies of letters he dictated that last day in the office of the American Foundation for Pharmaceutical Education. I believe I reviewed the last letter he signed. It was to a young man who had applied to the Foundation for financial aid and was as follows:

"I regret to inform you that the Board of Grants of the American Foundation for Pharmaceutical Education was unable to act favorably on your application for a Foundation Fellowshipship.

I am sure you realize that our applications for Fellowships are many and our funds limited.

I hope you will not be discouraged by this decision and that you will find it possible by other means to pursue your graduate study. If we can be of any help to you in any other way, please get in touch with us.

It may well be that when we are able to review the results of the first year of your graduate work, we can reconsider your

application and, on the basis of a better scholastic record, take more favorable action.

Good luck and kind regards."

Sincerely yours,

**Edwin L. Newcomb,**

Managing Director.

Notice how that letter, the last he ever wrote, ended on a note of hope and cheer and optimism. Dr. Newcomb's letters always did—so did his life.

The Christmas season will soon be here. As I think of Dr. Newcomb—his gentleness, his cheerfulness and his friendliness, I am reminded of the short Christmas sermon by Robert Louis Stevenson from which I shall quote as follows:

"The Kingdom of Heaven is of the childlike, of those who love and who give pleasure. Mighty men have lived long and done sternly and yet preserved this lovely character; the shame is indelible if we lose it."

"Gentleness and cheerfulness these come before all morality; they are the perfect duties. As we look back upon the past, we see how often we have transgressed the law of kindness."

"Life is not designed to minister to a man's vanity—full of rewards and pleasures as it is—so—to meet a friend fills one with surprising joys."

I am certain that when young men went to the office of the American Foundation for Pharmaceutical Education to make application for a Fellowship, they felt as they left, whether or not their application was successful, they felt that they had met a friend—and they were quite correct in that conviction.

I have been asked tonight to stress Dr. Newcomb's contributions through the agency of the American Foundation for Pharmaceutical Education. In doing so, my thoughts go back to the very early days of this most worthy organization. Dr. Newcomb not only has been connected with the Foundation since the time of its inception—he helped to conceive it and determine in its prenatal days, what kind of an organization it should be, and how it could best serve the profession of pharmacy.

I see meeting with Dr. Newcomb, Mr. James F. Hoge, Mr. S. B. Penick, Dr. Robert L. Swain and others who played important, if somewhat less prominent parts in its formative years. Mr. Charles S. Beardsley, the President of the Foundation, was one of its founders and charter members.

These early workers in the life of the Foundation built wisely and well, in fact so well that the American Foundation for Pharmaceutical Education has been referred to by various individuals, including Dr. Edward C. Elliott, as one of the most fundamental and important organizations in the whole profession of pharmacy.

If the American Foundation for Pharmaceutical Education is that important, it should challenge each one of us to play our full part in securing its future.

In spite of Dr. Newcomb's industry, in spite of his determination to leave no unfinished business, of necessity, he has left much for us to do. I share no uncertain feeling as to the future welfare of the American Foundation for Pharmaceutical Education for two reasons. First, it is a worthy organization that will be increasingly needed as the years go by. Secondly, I have an abiding faith, in what I like to refer to, as the enlightened generosity and good judgment of men of wealth in our profession. They are not interested in trivial things—neither was E. L. Newcomb. Dr. Newcomb gave much of his strength and life to the building of the Foundation and securing its future. Influential men from the various fields of pharmacy are doing likewise and will do still more as they learn about its present activities and its opportunities in the days to come.

I have recently reread Henry Van Dyke's little book entitled, "The Mansion". As I speak of giving to a worthy cause, I am reminded of John Weightman's troubled inquiry, near the end of the book, as he says to the Keeper of the Gate, "But how have I failed so wretchedly in all of the purpose of my life? What could I have done better?" What is it that counts here?"

And the answer came back, as Van Dyke says, in a bell-like voice. "Only that which is truly given. Only that good which is done for the love of doing it. Only those plans in which the welfare of others is the master thought. Only those labors in which the sacrifice is greater than the reward. Only those gifts in which the giver forgets himself."

There was something like that in the life of our departed friend. His many contributions to the Foundation were truly given. The welfare of others is the master thought which prompted the formation of the Foundation and around which it is organized.

Dr. Edwin L. Newcomb was a man of many talents. His interests were many and his activities varied and profound. He will be remembered by different people for different reasons. In commenting on his contributions to the Foundation, I close with the expressed conviction, that long after his activities in behalf of other worthy projects have been forgotten, the American Foundation for Pharmaceutical Education will



stand as a monument to the unselfish services and the constructive life of Dr. Edwin Leigh Newcomb.

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## The Citation

When the announcement was made, last spring, that Dr. Edwin Leigh Newcomb had been selected as the recipient of the Remington Medal for 1950, there was joy and satisfaction in all of the parts of our industry.

Manufacturers, wholesalers and retailers alike agreed that the right man had been found and designated.

Everyone, including Dr. Newcomb, looked forward to the happy hour when the medal would be presented to Dr. Newcomb, in the presence of his many admirers and friends.

But fate willed it otherwise. God's fingers beckoned and he went away to the great beyond "whence no traveler ever returns."

When the sun at eventide sinks below the horizon, the heaven will be aglow for many hours after its departure. Dr. Newcomb's heaven will remain luminous for time without end. He left much of himself behind. Though dead, he speaks through his accomplishments.

Other Remingtonians have gone before him. They will receive him with the same friendly countenance they wore on earth—but more lovable, more radiant, more spiritual. He will be at home with them.

The Remington medal, established in memory of a great pharmacist, is the highest reward that pharmacy can bestow on any man. It is a concrete evidence of work successfully performed and universally appreciated. As its golden color will not fade, as its metal will not rust, so will the memory of him to whom it was awarded never grow dim.

Mr. Allen Newcomb, worthy son of a worthy father, it is my privilege to place this medal into your hand. Guard it well. It is your illustrious father's most magnificent memento. We know that you will always cherish it.

CURT P. WIMMER.

## Abstract of Minutes of the Board of Directors Meeting American Foundation for Pharmaceutical Education Union League Club, New York City, November 17, 1950\*

President Beardsley convened the meeting at 11:10 A.M. At 1:00 P.M. he recessed the meeting for lunch and the early afternoon special meeting of the members of the American Foundation for Pharmaceutical Education. The meeting of the Board of Directors was reconvened at 3:05 P.M.

Dean Noel E. Foss was elected to fill out the unexpired term of the late Dean H. Evert Kendig as a director of the Foundation.

President Charles S. Beardsley presented an informal report in which he referred to the great loss suffered by the Foundation in the passing of Dr. Edwin L. Newcomb. He spoke of the continued progress being made by the Foundation and expressed the conviction that the new directors being elected at this meeting would greatly strengthen the Foundation. He stated that plans for the collection of funds were well under way and would be initiated soon.

Director George V. Doerr briefly outlined the job requirements which had guided his committee in its search for a new Executive Secretary. The work of the committee's progress was discussed and it was agreed that the whole discussion and action of the directors should, for the time being, be considered highly confidential.

The directors were informed that progress was being made in obtaining a new home for the Foundation.

A resolution was presented and approved to the effect that the initial terms of directors not representing associations, or additional representatives of associations, be such as may be stated by the members in the election of such directors.

Acting Secretary Little stated that he had prepared a revision of the booklet entitled "Prospectus of the American Foundation for Pharmaceutical Education". He recommended the inclusion of a statement in the application blank which would make it necessary for the applicant to declare the minimum amount of financial assistance he would need

\*This abstract is made from the minutes supplied the Editor by Acting Secretary Ernest Little and present those items which we believe are of the greatest interest to the Journal readers without giving all the details. The same applies to the abstract of the minutes of a special meeting of the members of the Foundation, which was held at the same place on the same date and which follows this abstract.—Ed.

from the Foundation for the year during which the Fellowship would be in operation. He also recommended that the dean of the college, where the applicant's undergraduate work was done, be requested by personal interviews with the applicant, to corroborate that the applicant's need for financial assistance was real and the amount requested reasonable. The possibility of financing **only two** of the three years of graduate study was discussed. The opinion was that these suggestions, and several others that the Acting Secretary was prepared to offer, might await the appointment of the new Executive Secretary.

The report of Treasurer S. B. Penick showed the total collections during the eight years of the Foundation's life to be \$1,881,133.81 and disbursements \$1,171,867.84. Holdings in U.S. Government Bonds \$690,000.00 and a cash balance of \$5,946.55.

A tentative budget was presented for consideration and revision or adoption at the annual meeting in April, 1951.

Acting Secretary Little stated that the item of \$100,000 in the budget for the 1950 domestic Fellowships had been overdrawn to the extent of about \$24,000 and that approximately \$16,000 more would be needed for renewals for the second semester. \$40,000 additional was approved to take care of these emergencies. Only 8 foreign Foundation Fellowships were in operation and the \$10,000 provided in the budget for that purpose would prove adequate.

Director Burt, Chairman of the Executive Committee of the A.A.C.P., presented a statement as representing the expenses of the 1950 Seminar on Pharmaceutical Administration held at Columbus, Ohio and expressed the hope that the Foundation would finance the 1951 Seminar in Pharmacology to be held in 1951. The total cost of the 1950 Seminar was \$4,514.53. It was decided that an item of \$6,000 would be placed in the 1951-1952 budget for the 1951 Summer Seminar.

Director Zopf, Secretary-Treasurer of the A.A.C.P., submitted a report showing the average yearly deficit of the **American Journal of Pharmaceutical Education**. The report shows that the cost of the 13 issues of **The Journal** from July 1947 to January 1950 inclusive totaled \$18,990.16. The income from subscriptions and sale of individual copies during the same period was \$4,482.18. Gifts from the American Foundation for Pharmaceutical Education covering this period totaled \$5,798.26 making a total income of \$10,280.44. The average cost per issue for the 13 issues was \$1,460.78, which makes an average yearly cost of \$5,483.12. This figure less the average yearly subscriptions makes the average yearly deficit \$4,383.34. Professor Zopf was assured of the interest of the Foundation in **The American Journal of Pharmaceutical Education** and was told that in all probability an item of \$5,000 would be included in the 1951-1952 budget for **The Journal's** support.

Acting Secretary Little reported that approximately 30 colleges had requested undergraduate scholarships and that about \$12,000 had been allocated for that purpose to date.

At the October 11, 1950, meeting of the Executive Committee a desire had been expressed to match the Newcomb Memorial Fund with Foundation funds when proper legal steps had been taken to make it a permanent fund. Mr. Penick was appointed to further consider the problem and in consultation with Counsel James F. Hoge, to bring in more definite recommendations for the consideration of the Directors. In the absence of Mr. Penick, Mr. Hoge made an informal report which was discussed and the Committee was authorized to continue its study as to the best method of formalizing the acceptance of the Newcomb Fund and the matching of this fund with Foundation Funds.

Adjournment occurred at 4:15 P.M.

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## Abstract of Minutes of Special Meeting of Members of the American Foundation for Pharmaceutical Education Union League Club, New York City, November 17, 1950

President Beardsley called the meeting to order at 2:30 P.M. An announcement was made regarding the passing of Dr. Edwin L. Newcomb and a resolution by Counsel James F. Hoge covering the great contribution made by Dr. Newcomb to pharmaceutical education and all other phases of pharmaceutical endeavor, and expressing the Foundation's appreciation for his life and service. It was ordered that this resolution be spread on the minutes of the meeting and that a copy be sent to his son Allen, and other members of his immediate family.

New members were elected to the Board of Directors as follows. The date of expiration of their terms follow each name: Mr. Alain G. Brush, April 1951. Mr. J. Mark Hiebert, April 1957; Mr. Eli Lilly, April 1953; Dean Hugo H. Schaefer, April 1951 (also recommended by A.A.C.P. for five year term beginning April 1951); Mr. John G. Searle, April 1955. Messrs. Brush, Hiebert, Lilly and Searle were elected members-at-large, not representing any national pharmaceutical association. Dean

Schaefer was elected as a representative of the A.A.A.C.P. Dr. Swain also pointed out that a recent revision of the by-laws automatically made Prof. Louis C. Zopf a member of the Board of Directors during his term of office as secretary-treasurer of the A.A.C.P. The members of the Foundation expressed the conviction that the Board of Directors would be greatly strengthened by these additions.

Acting Secretary Little presented the following statement:

"The American Foundation for Pharmaceutical Education has experienced what would seem to be an irreparable loss in the death of our Secretary and Managing Director, Dr. Edwin L. Newcomb.

"It would not be surprising if Dr. Newcomb's passing resulted in a let-down for the Foundation for a short interval of time. Decreased appropriations and lessened interest may result.

"I am not certain that such will be the case, but it would be a natural consequence of the passing of such a capable, well known and highly regarded leader as Dr. Newcomb.

"For the past several years the progress which the Foundation has made has been due in considerable measure to Dr. Newcomb's interest, his energy, his personality, the contacts he has established, and his personal solicitation of funds—at times almost on a "do-it-for-me" basis.

"Naturally, with as dynamic a leader as Dr. Newcomb, helpful results have been obtained and hundreds of thousands of dollars have been contributed each year.

"Now Dr. Newcomb is no longer with us and of necessity changes must be made. It is our responsibility to see to it that these changes are for the better and of benefit to the Foundation. I confidently believe that such results can be accomplished.

"I think it is significant that during the past several years the Foundation has experienced decreasing income. Decreasing income during years of prosperity, and increasing usefulness and service on the part of the Foundation. You men, as Members of the Foundation, have not only the right, but the responsibility of asking "why".

"Why should such an apparent contradiction exist? Could it be because the personal appeal method, the 'come on and do it for me' method is not the best, from a standpoint of long term policy. Is it because the real merits of the Foundation have not been sold to its donors and prospective donors? I believe both of these questions can be answered in the affirmative.

"The 'do it for me' appeal is especially helpful in the early life of an organization such as the American Foundation for Pharmaceutical Education. It becomes thread-bare with use and loses much of its effectiveness.

"Men of wealth may continue to respond to such an appeal for a considerable period of time, especially when it is made by an efficient, dynamic leader whom they admire and respect. Am I right in the assumption that each succeeding contribution may be made with lessened enthusiasm and finally even with mild resentment? Am I right in assuming that decreased contributions are a natural consequence of such an appeal?

"We need the services of every strong personality we can enlist. We need every helpful contact we can muster but equally, or even more so, we need a sound selling campaign based solidly on the merits and essentiality of the Foundation.

"This story is so genuine, so real, so convincing that anyone familiar with it would welcome the opportunity of relating it.

"I am most optimistic about the future of the Foundation. Optimistic, because I know the story is there, and because I have an abiding faith in the good intention and the enlightened generosity of men of wealth in the profession of pharmacy.

"I think of one man who contributed almost as much to one college as all our contributors have given to the Foundation during the eight years of its existence. Can we not, collectively, do as much for seventy colleges as one man has done for a single college? The contribution I refer to was not made exclusively as a result of a high regard for any one person. It required a strong personality to make and maintain the contact. A real honest-to-goodness, worthwhile story did the selling. The Dean of the College of Pharmacy to which I refer is meeting with us today.

"Let us raise and not lower our sights so far as the future of the Foundation is concerned.

Carl Schurz once said, 'Ideals are like stars, you will not succeed in touching them with your hands; but like the mariners of old on the oceans of waters we choose them as our guides and following them reach our destiny'.

"Objectives which can be reached day after tomorrow are of little value. We should adopt goals which we may never reach in our lifetime, but which will constantly stimulate us, and our successors, to greater and more efficient services in behalf of one of the most significant organizations in the whole field of pharmacy.

"One of the most fatal mistakes we could make at this vital period of the Foundation's history is to think small. Let us never forget that the man who succeeds is the fellow who thinks he can.

"The future of the Foundation is bright. The objectives are sound, and need no further revision than was given them just a few months ago.



"Our Board of Directors is being strengthened by the addition of capable men who give liberally of their time to worthy projects and none at all to inconsequential matters. That is all in our favor. What is equally important, we are maintaining the interest of our key-workers of the past, men such as President Beardsley, Mr. Doerr, Mr. Penick, Dr. Swain, Mr. Hoge and others who have contributed richly in days gone by.

"We shall have a capable Executive Secretary in a matter of months. That seems like a long time to the Acting Secretary, but better to be unhurried and get the right man, than to move with too much dispatch and regret it later. Procrastination is indefensible, but let us not feel hurried in the choice of a Secretary.

"I have many suggestions I would like to make to the incoming Secretary which seem to me to be important. There are also sizable economies which can be effected.

"Let us look to the future of the Foundation with confidence, with courage and with determination. What has been done thus far is only a very meager beginning. Let us pick up the torch where Dr. Newcomb was forced to lay it down. Carry it forward as he would have done and make of the Foundation the instrument of service which its founders intended it to be."

The proxy holders were invited to remain for the reconvened meeting of the Board of Directors. All proxy holders remained for the meeting.

The meeting adjourned at 3:05 p.m.

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## Minutes of the Executive Committee (1950-1951) of the American Association of Colleges of Pharmacy

PALMER HOUSE . . . CHICAGO, ILLINOIS

November 13 and 14, 1950

1. The meeting of the Executive Committee of the American Association of Colleges of Pharmacy was called to order by Chairman Joseph

B. Burt at 9:30 a.m. on Monday, November 13, 1950. Present were—President Hugo H. Schaefer, Editor R. A. Lyman, Deans B. V. Christensen, John F. McCloskey, J. Allen Reese, George E. Crossen, Assistant Dean Linwood F. Tice, Professor George L. Webster and Secretary-Treasurer Louis C. Zopf.

2. Chairman Burt presented the following report for enrollment in the 74 colleges of pharmacy in the Continental United States and the University of Puerto Rico.

Undergraduate (member schools).....	17,085*
Undergraduate (non-member schools) .....	2,813
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Undergraduate (Total) .....	19,898
<hr/>	
Graduate (member schools) .....	464
Graduate (non-member schools).....	3
<hr/>	
Graduate (Total) .....	467

3. The minutes of the Atlantic City meeting were approved as published.

4. Secretary Zopf presented a request from Mr. S. A. Witmer, 4112 Arlington Avenue, Fort Wayne 6, Indiana, a graduate student in the Department of Education at the University of Chicago, to circulate a questionnaire to the deans of member schools seeking information on his problem, "A Comparison of the Standards of Accreditation in Professional Education With Those of the North Central Association of Colleges and Secondary Schools."

Christensen-Lyman moved that the Executive Committee grant approval and that President Schaefer prepare a letter granting the endorsement and also indicate to Mr. Witmer that we have but one accrediting agency.—Carried.

5. President Schaefer was authorized to arrange for a representative to attend the inauguration of Thomas Raymond McConnell as Chancellor of the University of Buffalo on Saturday, January 6, 1951.

6. Dean Christensen presented the report of the Seminar in Pharmacy Administration and Secretary Zopf presented the itemized financial statement. Both were discussed and approved.

7. Dean McCloskey presented the preliminary and revealing report of the Sub-Committee on Summer School Programs.

Christensen-Schaefer moved that the preliminary report of the Sub-Committee on Summer School Programs, together with the committee's suggested recommendations, be mimeographed in sufficient quantity to assure five

\* Does not include the University of the Philippines.

- (5) copies for distribution to all colleges of pharmacy.—  
Carried.

Chairman McCloskey was instructed to notify each member college that the report would be a subject for discussion at the next annual meeting and that all recommendations in connection therewith should be forwarded to him prior to the August meeting.

8. In response to a question regarding acceleration of the teaching program from a member college to Chairman Burt,

It was moved by Webster-Crossen that the Executive Committee reaffirm the position previously taken by the Association opposing continuation or implementation of acceleration of the teaching program.—Carried.

Dr. P. H. Costello, Secretary of the N.A.B.P. and A.C.P.E. and Dr. Richard A. Deno, Assistant Director of the A.C.P.E., joined the Committee at lunch.

Resolutions from the N.A.B.P. directed to the A.A.C.P. and program topics for district meetings were discussed with Secretary Costello.

Dr. Deno spoke favorably about his recent visit at the University of Oklahoma, School of Pharmacy.

9. Schaefer-Christensen moved that as a basis for reinstatement to membership in this Association, the University of Oklahoma, School of Pharmacy, be requested to furnish a transcript of all students who have graduated and will graduate between August, 1950 and July 1, 1951, and that a statement of attitude of future compliance with the three-year rule be sent to this Committee signed by the President of the University and the Dean of the School of Pharmacy.—Carried.

10. The Committee discussed at length, the offer of the Plant Science Seminar to assist with plans for a seminar in biological sciences; President Schaefer's recommendation for a seminar on general and modern teaching procedures; a seminar for pharmaceutical chemistry and seminar for teachers of pharmacology. The Plant Science Seminar invitation was declined and action was deferred on President Schaefer's resolution.

It was voted that the Seminar of 1951 be a Teacher's Seminar on Pharmacology (and prerequisite subjects) and that it should be held sometime during the latter half of the month of June.

11. The Executive Committee approved the publication, in bound form, of the proceedings and papers of the special seminars and the transmittal of a copy to each member college.

12. Following a review of the financial report of the Association as of the close of the fiscal year and after reviewing future objectives of the Association,

It was moved by Schaefer-Christensen that the Executive Committee recommend that Article II of the By-Laws be changed and that effective 1951-1952, the annual dues for membership in the Association shall be \$200.00.—Carried.

13. The Executive Committee discussed the establishment of a Teacher Placement Bureau by the Association, through the Office of the Association Secretary, and reaffirmed its opinion as to the desirability of such a service.

**Recess 6:00 p.m.**

**Reconvened 8:30 p. m.**

13a. Salary scales for faculty members of A.A.C.P. Colleges were discussed.

On motion of Schaefer-Webster, the chairman was instructed to appoint a committee to obtain information as to the prevailing salaries in the various faculty ranks. Chairman Burt appointed the following committee: Dean George E. Crossen, Professor George L. Webster, and Dean John F. McCloskey, Chairman.—Carried.

14. The Executive Committee reviewed the Atlantic City report of the Committee on Predictive and Achievement Tests and agreed with the Committee's statement of functions and endorsed their stated objectives.

15. The policies and plans for the American Journal of Pharmaceutical Education were carefully reviewed together with a financial statement presented by the Secretary-Treasurer for the last thirteen issues which clearly indicated that continued financial aid from the American Foundation for Pharmaceutical Education is imperative.

16. Professor Tice, Chairman of the Sub-Committee on Brochure on Pharmacy reviewed the progress on the Brochure and outlined suggestions for the final draft.

Schaefer-Webster moved that an expression of confidence be extended for Chairman Tice's plan and that the brochure continue to be developed as the Association's booklet, with copies of the final draft to be submitted to the Executive Committee.—Carried.

Adjourned 11:00 p.m.

## **SECOND SESSION**

**November 14, 1950**

**Reconvened 9:00 a.m.**

Meeting was called to order by Chairman Burt at 9:00 a.m. with all members present.

17. Suggestions for the revision of the Association forms for membership were considered.

18. Chairman Burt read correspondence with Dean J. F. Kowalinski of the Cincinnati College of Pharmacy, concerning the required three years of residence for advanced students transferring credit to Colleges of Pharmacy.

Schaefer-Webster moved that the Executive Committee endorse the position taken by Chairman Burt, which was to the effect that such students were to be required to carry at least the minimum number of credit hours to maintain their standings as regular students for three full academic years.—Carried.

19. Dean Crossen reported favorably on the application for membership from the College of Pharmacy of the University of New Mexico.

Schaefer-Crossen moved that the application submitted be favorably considered with final action deferred until the next meeting of the Executive Committee, by which time, clarification of certain points in the application can be made.—Carried.

20. It was voted that our representatives on the American Council for Pharmaceutical Education be requested to present to the Council the matter of membership in the American Association of Colleges of Pharmacy as a prerequisite for accreditation.

21. Professor George L. Webster was nominated to represent this Association for a full term as a director of the American Foundation for Pharmaceutical Education, effective April, 1951.

22. Crossen-Christensen moved the adoption of Resolution Number 48 (A.A.C.P. Meeting 1950) from President-Elect Schaefer's address. "Resolved that paragraph 12 of our By-Laws be interpreted as meaning that any proposed change in the qualifications for membership must be presented at a meeting of the Association in the form in which it is to be mailed to the member colleges and in which it is to be voted. on at the subsequent meeting."—Carried.

23. Resolution Number 49 (A.A.C.P. Meeting 1950) from President-Elect Schaefer's address. "Resolved that we favor changing paragraph 3 (c) of the 'Standards to be Used as a Basis of Accreditation of Colleges of Pharmacy' of the American Council on Pharmaceutical Education

to provide for a minimum of a three-year sequence of pharmacy and other professional subjects for students entering with advanced standing from non-pharmacy schools'."

It was voted by the Executive Committee to request our members on the Council to discuss the desirability of such a change with the Council.

24. Resolution Number 7 (A.A.C.P. Meeting 1950) from President-Elect Schaefer's address. "Resolved that the N.A.B.P. and A.A.C.P. (of District No. 1) go on record as favoring a Public Relations Committee on a national level to promote good will and disseminate information pertaining to retail pharmacy." Action was deferred on implementation of this resolution pending receipt of further information.

25. The President, Chairman of the Executive Committee, and Secretary-Treasurer of the Association have been authorized to function as a committee for the scheduling of officer representation at district meetings of the A.A.C.P.-N.A.B.P.

26. Editor Lyman presented a report on the status of a Cumulative Index of the American Journal of Pharmaceutical Education and,

Crossen-Tice moved that the Editor be requested to insert the masthead of the Journal together with a statement to the effect that it is the official publication of this Association.—Carried.

27. The need for and the possibility of obtaining a permanent secretary for the Association was discussed. Chairman Burt appointed the following committee to survey the estimated cost of a permanent secretary to be presented to the Association before establishing such an office. Committee—George E. Crossen, John F. McCloskey, and George L. Webster, Chairman.

28. Chairman Burt reported that he had replied to a request from a member college for approval of a procedure for granting credit to students called into service in the Armed Forces before the end of the term, quarter or semester by stating that he did not believe the Association would wish to make any specific ruling in this connection. The Executive Committee endorsed Chairman Burt's action relative to the Association's attitude toward credit adjustment for students entering the Armed Forces.

29. Consideration was given to the program for the 1951 meeting.

30. It was voted that Editor R. A. Lyman be authorized to transmit a copy of the October, 1951 Journal, which contains the memorial to



Dr. E. L. Newcomb to the family of Dr. Newcomb together with a letter of transmittal from the Executive Committee.

31. Dean McCloskey reported that the wishes of the Executive Committee regarding the Constitution and By-Laws of the several Sections of Teachers and the By-Laws of the Committee on Teachers' Conferences as adopted by these groups now meet all of the requirements of the Executive Committee.

On motion by Schaefer-Christensen the report was approved.

Adjourned 1:30 p.m.

LOUIS C. ZOFF,

Secretary-Treasurer.

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## Enrollment in Schools and Colleges of Pharmacy

I am grateful to Editor Lyman for his invitation to submit for publication in the American Journal of Pharmaceutical Education a few comments on enrollment in the schools and colleges of pharmacy for the current year, and a brief discussion of the report for 1950-51 which has recently been issued. This affords an opportunity for bringing attention to the correction of a few errors which have been discovered in the report; errors seem to be almost inevitable in a report of this magnitude.

I am indebted to Dr. P. H. Costello, Secretary of the National Association of Boards of Pharmacy, for bringing to my attention an error in addition which involves a decrease of two in the totals shown for men students, and this error, when carried forwards results in repetitions of the error in other totals. Correction should be made in the total shown on page 3 of the report for the column headed "Sr. Men," by changing this to 4,125 instead of 4,127. The totals on page 4 for "Sr. Men," "Total Men," and "Tot.," should each be decreased by two.

This same error also affects three totals for undergraduate enrollment in the summary shown on page 16, showing "Senior Men," "Total

Men," and "Total"; all of these should be decreased by two. In this same table, under the heading "Breakdown of Enrollment—Men," the total for the columns headed "No. Regularly Adv. from Preceding Class," should read 11,648 instead of 18,518.

Very recently errors have been discovered in the figures shown as totals for students admitted to the member colleges with advanced standing. On page 7, the total for men admitted with advanced standing should be 1,524 instead of 152 (a typographical error); on page 10 the total for women should be 125 instead of 16.

Since the report was released, it has been found that the tabulation at the bottom of page 16 failed to include the report of one school. Accordingly, this should be changed to read as follows: "Masters' Degrees Conferred - 1949-50, 99; No. of These Planning to Teach or Teaching, 19; Doctors' Degrees Conferred - 1949-50, 46; No. of These Planning to Teach or Teaching, 19."

Space does not permit reproduction here of all 16 pages of the report on enrollment for the first semester, quarter or term of 1950-51. We have, however, prepared a summary of this data, which is shown together with corresponding data for the two preceding years, 1948-49 and 1949-50, in the table presented herewith under the title "Summary of Enrollment in Colleges of Pharmacy." Information given in the table is restricted to data on undergraduate enrollment.

It is remarkable that the report for all three years includes data on every school or college of pharmacy in the continental United States. Such cooperation is worthy of special commendation. The reports for the last two years also include data from the University of Puerto Rico. Although the number of non-member colleges varies from year to year, in each case reports were received from every school in operation at the date the reports were requested.

Some explanation should be made of what appears to be a discrepancy in the totals shown for the year 1949-50. In the reports for that year, 101 students in member colleges and three students in non-member colleges were listed as "unclassified." Lack of information as to the distribution of these according to sex makes it impossible to show these under either "Men" or "Women." These are, however, included in the totals for the appropriate categories. For this reason, the distribution by percentage according to sex shown for the year 1949-50 is not completely accurate; on the other hand, the relatively small numbers of unclassified students and the probability that the pattern of distribution according to sex in the unclassified group closely resembles that of the classified group tend to minimize the error here.

It appears that the peak in undergraduate enrollment was reached in 1949-50, with a maximum of 21,376. A factor in the reversal of the upward trend in the current enrollment may be the rapidly decreasing

number of students receiving benefits under Public Laws 16 or 346, which currently represents 34.7 per cent of total enrollment, as compared with 50.3 per cent last year and 61.8 per cent the year before.

Percentage distribution figures show that the proportion of women students and the proportion of students admitted with advanced credit have remained fairly constant during the past three years.

Enrollment of graduate students continues to show an upward trend. Totals for the three years are as follows: 1948-49, 359; 1949-50, 401, and 1950-51, 467. For the same three years, Masters' degrees conferred were 66, 73, and 99 respectively; Doctors' degrees also were conferred in progressively larger number during the same period, that is, 22, 31, and 46, respectively. The number of graduate students receiving benefits under Public Laws 16 and 346 were 143 (in 1948-49); 189 (in 1949-50) and 154 (in 1950-51). The number of persons receiving graduate degrees known to have entered the teaching profession were as follows: in 1948-49, 34; in 1949-50, 38; and in 1950-51, 38.

A summary of the enrollment follows.

JOSEPH B. BURT, *Chairman,*  
Executive Committee.

#### SUMMARY OF ENROLLMENT IN COLLEGES OF PHARMACY

##### Member Colleges

	First Semester, Quarter or Term		
	1948-49	1949-50	1950-51
Number Reporting .....	63*	62**	62**
Men .....	17,252	17,120	15,481
Women .....	1,766	1,760	1,604
Total .....	19,018	18,981	17,085
Under P.L. 16 or 346 .....	11,760	9,453	5,800
Adm. with Adv. Standing .....	2,366	1,802	1,649

##### Non-Member Colleges

Number Reporting .....	8	11	13
Men .....	1,736	2,236	2,611
Women .....	149	156	202
Total .....	1,885	2,395	2,813
Under P.L. 16 or 346 .....	1,168	1,303	1,098
Adm. with Adv. Standing .....	128	223	276

##### Combined Totals

Number Reporting .....	71	73	75
Men .....	18,988	19,356	18,092
Women .....	1,915	1,916	1,806
Total .....	20,903	21,376	19,898
Under P.L. 16 or 346 .....	12,928	10,756	6,898
Adm. with Adv. Standing .....	2,494	2,061	1,925

\* Does not include the University of the Philippines and Puerto Rico.

\*\* Does not include the University of the Philippines.

**DISTRIBUTION BY PERCENTAGE**

	First Semester, Quarter or Term		
	1948-49 %	1949-50 %	1950-51 %
<b>Member Colleges</b>			
Men .....	90.7	90.2	90.6
Women .....	9.3	9.8	9.4
Under P.L. 16 or 346 .....	61.8	49.8	33.9
Adm. with Adv. Standing .....	12.4	9.5	9.3
<b>Non-Member Colleges</b>			
Men .....	92.1	90.6	92.8
Women .....	7.9	9.4	7.2
Under P.L. 16 or 346 .....	61.9	54.4	39.0
Adm. with Adv. Standing .....	6.8	9.3	9.8
<b>Combined Totals</b>			
Men .....	90.8	90.5	90.9
Women .....	9.2	9.5	9.1
Under P.L. 16 or 346 .....	61.8	50.3	34.7
Adm. with Adv. Standing .....	11.9	9.5	9.7

## Dedication of the Pharmacy Museum\*

### La Pharmacie Francais de Louis Dufilho

JOHN F. McCLOSKEY

Loyola University, College of Pharmacy

Mr. Chairman, Commissioner Schiro, Reverend Father Shields, S. J., distinguished Guests, and Friends of Pharmacy:

This is one of the happiest occasions that I have experienced in years. It is the culmination of a program stated nearly twenty years ago when Loyola University undertook the assembling of ancient pharmaceutical equipment and material for the purpose of creating a pharmaceutical museum on the campus of the University.

This project proceeded slowly, but during the formative years the personal material and equipment of the founders of this Museum was

\* This address was delivered by Dean McCloskey on October 19, 1950, on the occasion of the dedication of the Pharmacy Museum at 514 Chartres Street, New Orleans, Louisiana. Dean McCloskey is one of the three founders of the Museum and a member of the Historical Pharmacy Commission. His address covers the historical development of the Museum. In the dedicatory address which follows, Dr. George Urdang discusses the significance of the Museum in respect to American pharmacy and American culture.—Ed.

being used to educate our young student pharmacists and to stimulate others to get interested in collecting material for a Pharmacy Museum. Some of our older pharmacists did become interested. Men like Mr. Adam Wirth, Mr. Louis J. Hubert, Mr. John Scott, Mrs. A. D. Trapani and a few others came to our assistance and helped and encouraged us to proceed with the program.

About 1939, Dr. Edward J. Ireland joined our faculty at the University and there he found a program for which he was ideally suited and deeply interested in. Dr. Ireland had been taught and had worked with one of the best informed men on American Pharmaceutical History, the late Dr. Edward Kremers of the University of Wisconsin and who was the same man with whom our guest speaker tonight worked since his arrival in this country in 1936. It was the driving force of Dr. Ireland and his untiring efforts that has kept this project moving over the years.

At the University we had about decided that a Pharmacy Museum on the campus would not be as valuable to our city as one located in this world-renowned and historic Vieux Carre. Thereupon, Dr. Ireland and your speaker began a search for old apothecary shop locations in the "Quarter" and had found several of importance. About this time, Mrs. LeGrand J. Crumb, well known to all of you for her civic activities and interests in the "Quarter", had stirred up activity to save this old historic building which now houses the Museum. Her efforts were joined with other members of the Vieux Carre Commission and the present founders of the Museum and resulted in a definite plan for a pharmacy museum.

A young professor, Dr. Cowen of the Rutgers University in New Jersey, was doing some research on early pharmacy laws and discovered that Louis J. Dufilho and Francois Grandchamps were the first two registered pharmacists in the United States. Our own Vieux Carre Commission confirmed our finding that this building was the original drugstore of Mr. Dufilho in 1825 and that he built this structure in 1822 as his home and apothecary shop. Thus we had an ideal combination, full of history and tradition from the foundation to the roof 3½ stories above. This fact can be claimed by few if any historical museums.

We, the citizens of our State, are deeply indebted to Dr. Ireland and Mrs. Crumb for it was through their sincere efforts that we now have this wonderful museum. No job was too big or too little for them to undertake, no location too far away for them to go to secure material for the Museum. Without them, New Orleans would have been passing up one of the great opportunities for world-wide recognition which this Museum will bring in the future years.

You have heard the worthy compliments to our Mayor Morrison and his co-workers for making this Museum building possible, may I add

my personal thanks for their unlimited confidence in us to present something of great value to our city. They did not know what a pharmacy museum was like, they literally were buying a pig in a poke, but they had confidence in us and tonight I think we have repaid that confidence.

Public thanks is due Reverend Thomas J. Shields, S. J., President of Loyola University and his predecessor, Reverend John J. Hynes, S. J., and Reverend Harold A. Gaudin, S. J., for their permission to allow their faculty members to devote so much time over the past ten years to the Museum project.

A special word of thanks is recorded to our late President, Reverend Percy A. Roy, S. J., who devoted so much of his personal time and effort with Mayor Maestri to get this building exclusively for a Pharmacy Museum. Father Roy also stimulated and encouraged our late Commissioner of Public Utilities, Fred A. Earhart to join with us in this grand project and to use his every influence to help the founders get the Museum in operation.

Loyola University is to be thanked for the generosity with which which she expended sums of money at various times, when the personal funds of the founders were low, to help us defray the mounting expenses of collecting this material which in time will become world-renowned.

I would be remiss if I failed to thank the many city workmen who devoted much help to us in getting this Museum ready. Likewise, our thanks to the many pharmacists who have come to our assistance with money when needed and also to those who have located material for us to collect.

And lastly no greater compliment is due any one than that which goes to the students from the Loyola College of Pharmacy. Unlimited thanks is due to the students who during the past ten years have worked long and hard to help us present to you what you will find in this Museum. These students, many of them now practicing pharmacy over the state and nation will never forget their contribution of labor and love for this Museum.

It is always unfortunate when incorrect, unfair, prejudicial and misleading publicity is released. This has occurred with this Museum.

The major portion of the material in this Museum is the personal property of Loyola University through the founders of the Museum. This material has been used to create this Museum. Therefore, I want it to be publically known that my University has sponsored this project, has loaned its material and has given time, money and labor to present to you, our citizens, and to the world at large, a Museum that will be a pride and joy to you, one that will in the near future be outstanding among Museums. This Museum will be a mecca for visitors, it will be



an asset to our city and as an educational and cultural factor it will have unlimited possibilities.

The history of this Museum in all of its details is now being written. A booklet listing all donors and many other facts will be available for distribution in the near future.

Every big project begets many details, we hope that our friends and donors will be patient with us for a while until we get every piece in the Museum properly cleaned and labeled with the donors name and essential facts.

In closing, all that I can say is that I thank you one and all from the bottom of my heart for this wonderful occasion.

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## Address

### Dedication of Pharmacy Museum, New Orleans, Louisiana, October 19, 1950

**DR. GEORGE URDANG**

**Director of the American Institute of the History of Pharmacy  
University of Wisconsin**

Mr. Commissioner, Ladies and Gentlemen:

The speakers preceeding me have so beautifully and truthfully expressed the meaning of the Museum, the opening of which we are celebrating, that it would be difficult, indeed, to compete with them. Fortunately, I am not here to compete in an oratorical contest. Mine is the much more pleasant task which I am supposed to meet: the evaluation from a pharmaceutico-historical point of view of this newest contribution to the representation of American culture.

Let me state first of all that this new Museum really represents American culture, and by no means merely by its contents and its appearance. It testifies to this culture, furthermore, through the fact that this venture has been developed in harmonious cooperation of town and gown, of Loyola University and especially its College of Pharmacy, of pharmacists all over the State of Louisiana and even beyond the borderline, of plain citizens and, crowning the entire endeavor and giving it the necessary financial as well as moral support, the City of New

Orleans. If by culture we understand a state of blending of intellectual, artistical and emotional trends expressing itself in a specific harmony of creative action, then we are entitled to take this fruitful cooperation for the sake of an idealistic goal as an act of culture. As representative of a remarkable symbiosis between pharmacist and City Official which became very useful in this special case, the name of the late Mr. Earhart will always be remembered and for the importance of civic interest on the part of people not connected with a venture by professional or other personal interest bonds, the name of Mrs. Crumb has achieved a kind of symbolic meaning.

It is with the greatest of pleasure, indeed, that I put the seal of pharmaceutico-historical approval on the new Museum. Its historical importance is obvious. It has been said before that the shop, which has been conducted in this building by Mr. Dufilho in the early nineteenth century and which now has been revived in a still more significant way, was the "first drugstore in the United States." That can not be taken literally. There have been drugstores in territory that is now the United States of America already in the seventeenth and, in ever growing numbers in the eighteenth century. But since it was Louisiana that established the first Pharmacy Law in this country, and Mr. Dufilho was the first one to be licensed, it can well be said that his pharmacy was the first United States apothecary shop to be conducted on the basis of proven adequacy, hence as a recognized part of a public welfare system.

This is one factor that makes this Museum unique, or, to put it in another way, different from other historical apothecary shops serving as witnesses of pharmaceutical past. Another lies in the realization of the charming idea to supplement the revival of the professional old time atmosphere by the social one. The old living rooms of the Dufilhos above the store are equipped with furniture of the period thus making the house the complete working and living unit that it was in time bygone.

The most important difference, however, of just this Museum from all similar ones may be seen in its mirroring an epoch of blending of European and American custom and culture, as expressed in pharmacy, at a very particular place and in a very particular way. It was a French general and pharmaceutical tradition which has been amalgamated at this place, and it could take this specific development only in this very city which, in its more expanded growth, went through the same stages. The pharmaceutical microcosm mirrored the municipal macrocosm and each of the two is still—and through this Museum will continue—testifying to each other.

My very best wishes are with this Museum and all who worked on it and contributed to it, now and for all time to come!

Thank you: very much!

## A Resume' of the Papers Presented on the Program of the Section on Medical Sciences (Subsection on Pharmacy Np) of the American Association for the Advancement of Science at the 1950 Cleveland Meeting

The Subsection held four sessions during the Cleveland meeting. The first two sessions were devoted to papers reporting original research. The last two sessions were devoted to a Hospital Pharmacy Seminar.

R. F. Prindle of Strong, Cobb and Company, Inc., Cleveland, presented data showing the stability of various vitamins in a variety of pharmaceutical products. The behavior of Vitamin A, Thiamine, ascorbic acid, calcium pantothenate and niacin and niacin amide was described. Stability studies on tablets, liquids, hard and soft capsules at room temperature and under accelerated storage conditions, and the effect of common excipients such as mineral salts, liver preparations, and coating materials was set forth.

L. Maresh and R. F. Prindle of Strong, Cobb and Company, Inc., Cleveland, described a rapid, accurate, and specific colorimetric method for the determination of ferrous and ferric gluconate. A method based on the color developed by the addition of alpha, alpha'-dipyridyl was found to be applicable to a wide variety of pharmaceutical preparations, particularly tablets and liquids which give a colored aqueous solution. Evidence was presented showing the stability of ferrous gluconate in both tablets and liquids under accelerated and room temperature storage conditions.

F. Shelton and G. A. Grant of Ayerst, McKenna and Harrison, Ltd., Montreal, Canada, showed that some alkyl sugar derivatives have interesting diuretic properties which make them of potential usefulness as therapeutic agents.

R. A. Ravich and E. Revici from the Institute of Applied Biology, Brooklyn, described the effect of n-butanol in sodium salt solutions upon shock and survival of mice exposed to severe extensive thermal burns. They presented evidence that n-butanol has definite value as a therapeutic agent as compared to present methods of treating burns. Since improved burn therapy may be important in the event of atomic war-

fare, their findings take on unusual importance and may lead to improved products in the treatment of other burns.

P. M. Scott, L. D. Edwards, and J. E. Christian studied the penetration of certain sodium alkyl sulfates and sodium sulfate through rat and mouse skin. Each of these sulphates was labelled with S 35, which made it possible to detect their skin penetrability when applied and massaged in aqueous preparations to the belly skin by means of 19 mm. glass rings previously secured to the tip of the sternum.

It was found that the short chained alkyl sulfates penetrated at a greater rate than the long chained sulfates. Also it was found that sodium sulfate penetrated at a rate dependent upon the concentration of the applied material e.g., the higher the concentration the greater was the amount of activity of a given quantity of urine. Massage increased this rate of penetration. Furthermore there was occasionally evidence from radioautographs of skin sections which showed that penetration of the skin was by way of the hair canals and follicles.

J. E. Christian, J. J. Pinajian, and W. E. Wright of Purdue University School of Pharmacy described an isotope dilution procedure of analysis having wide application.

The isotope dilution procedure of analysis is discussed from the standpoint of the history of its development, the literature, and advantages, disadvantages and usefulness of the method. The procedure is discussed in two parts: (1) direct isotope dilution and (2) inverse isotope dilution. Methods of calculation, errors to be expected and sensitivity are also discussed. The method is stated to have many possible applications to analytical problems that cannot be solved in any other manner and to problems which are difficult by usual procedures. The method should find extensive applications in many fields of analytical chemistry including pharmaceutical analytical chemistry.

A. R. Biamonte and G. H. Schneller of the American Cyanamid Company, Calco Chemical Division, Bound Brook, New Jersey, reported their study of the stability of folic acid in solutions of the B complex vitamins.

The stability of folic acid was studied at pH values between 3 and 7 in liquid media containing individually and conjointly the following members of the vitamin B. complex: thiamine hydrochloride, riboflavin, nicotinamide, pyridoxine, and pantothenyl alcohol. At the lower pH levels where water or sucrose syrup were used as vehicles, the folic acid was largely undissolved, whereas at the higher pH levels, the folic acid in the concentration used was completely dissolved. In a mixture of propylene glycol and water, the folic acid was completely dissolved throughout the entire pH range. Data are presented on the amount of folic acid decomposition after storage at room temperature and also at 45° C. In general, riboflavin and thiamine caused considerable decom-

position of folic acid in solution. Specimens at the lower pH levels where the folic acid was for the most part undissolved exhibited a stability which might be practical for pharmaceutical compounding purposes. Nicotinamide, pyridoxine, and pantothenyl alcohol did not materially affect the stability of folic acid in solution. Data are also presented on the solubility of folic acid in water as a function of pH and of temperature, and on the stability of folic acid in aqueous media as a function of pH.

The decomposition of folic acid in the presence of riboflavin and thiamine involves cleavage at the methylene linkage, liberating para aminobenzoyl glutamic acid. This is analogous to the reaction which takes place upon the acid reduction of folic acid as is used in the chemical determination of this substance.

S. D. Bailey, P. A. Geary, and A. E. DeWald of the Research Division, Smith, Kline and French Laboratories, Philadelphia, Pennsylvania, gave the results of ultraviolet, infrared and polarographic studies on three principles isolated from Ammi Visnaga. They found that infrared absorption provided a method for the estimation of each principle in fractions containing khellin, visnagin, and khellol-glucoside.

W. C. Ellenbogen, E. S. Rump, P. A. Geary and M. Burke of the same Laboratories presented methods for the determination of these three principles isolated from Ammi Visnaga Lam. They found that by using reference standards they could obtain reproducible results using ultraviolet and polarographic methods for determining khellin and visnagin and showed that the ultraviolet analysis method was the preferred one.

M. G. Girbin of Strong, Cobb and Company, Inc., Cleveland, reviewed analytical problems in pharmaceutical work and pointed out the difficulty of applying the usual methods since substances which interfere with the determination of the individual components often are present. Reviewed were modifications of known methods or development of new ones, in order to determine within reasonable tolerances the active constituent or constituents of various products.

G. C. Walker, H. G. DeKay and C. L. Porter of Purdue University studied the antifungal properties of some antihistamines. They found that using the isolated mycelial disk technique antihistamines showed no fungicidal activity toward *T. mentagrophytes*. Using the agar cup plate method of fungistatic testing, however, showed all the antihistamines tested possessed definite inhibitory activity against *T. mentagrophytes*. Antergan and Phenergan appeared to be the most active of the compounds tested in a non-ionic ointment base.

M. R. Loran and E. P. Guth of Ohio State University developed a five phase diagram drawn of the ternary system, Castor Oil, 95% alcohol and water and determined the various ratios at which solutions of these

three components can be prepared. They illustrated the practical use of the phase rule in pharmacy in the preparation of solutions of two immiscible liquids utilizing a third liquid which is miscible with both.

The Hospital Pharmacy Seminar on Friday morning was presided over by Mrs. Evelyn Gray Scott of Saint Luke's Hospital, Cleveland. United States Army moving pictures were shown depicting the medical effects of the atomic bomb and medical services in atomic disaster. These pictures were followed by a panel discussion on the subject "The Responsibilities of the Pharmacist in Civilian Defense".

The afternoon session on Friday, December 29, was devoted to the Hospital Pharmacy Seminar with Don E. Francke of the University Hospital, Ann Arbor, Michigan, presiding. G. F. Archambault of the U. S. Public Health Service discussed "The Importance of Amber Glass for Prescription Containers".

B. E. Conley of the American Medical Association Laboratories presented a discussion under the title "Recent Developments in Pesticides."

J. J. Pinajian of Purdue University, School of Pharmacy explained the factors necessary in establishing a laboratory for radioactive materials in the hospital pharmacy.

V. L. Conley of the American Medical Association Laboratories spoke on the subject "Pharmaceutical Aspects of Sun Screen Compounds".

In general the Hospital Pharmacy seminars were stimulating and well attended by a representative group of hospital pharmacists from the Cleveland area.

GLENN L. JENKINS,

Secretary.

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The following list gives the names, the addresses and the affiliations of the 64 persons attending the Pharmacy subsection meeting of the 1950 convention of the A.A.A.S. at Cleveland.

Glenn L. Jenkins, John Pinajian, and L. D. Edwards, Purdue University; D. F. Biel, Milwaukee, Wisc. Lakeside Laboratories; Muriel Loran, Columbus, Ohio State University; W. D. Wilcox, Philadelphia, Lea and Febiger; J. O. Bellard and W. W. Hilty, Indianapolis, Eli Lilly and Company; Sister M. Claire, Sioux City, Iowa, Briar Cliff College; Sister M. Margerite, O.S.F. Granville, Ia., St. Joseph School; T. L. Cruse, Lake-



wood, Ohio and R. F. Prindle, L. Maresh, Wm. N. Doushkess, M. G. Girbino, Walter F. Wargell, and W. W. Hosler (2654 Lusbon Road) all of Cleveland, Strong Cobb and Co.; R. A. Ravich, Brooklyn, Institute of Applied Biology; F. R. Skelton, Montreal, Canada, Ayerst, McKenna and Harrison, Ltd.; Don E. Francke, University of Michigan; R. E. Thompson, Chicago, Armour and Co.; Chas. Rabe, St. Louis College of Pharmacy; Jack Cooper, Summit, N. J., Ciba Pharmaceutical Products; W. O. Hays, Crile V. A. Hospital, Veterans Administration; Elizabeth Jacobson, 728 E. 126 St., Cleveland, Drug Trade News, 330 W. 42nd St., New York; W. C. Ellenbogen and S. D. Bailey, both of 1530 Spring Garden St. Philadelphia, Smith, Kline and French Laboratories; A. L. Lavia, 673 Jerome St., Brooklyn, E. R. Squibb and Sons; E. G. Scott, 1938 E. 116 St., Cleveland, St. Luke's Hospital; J. W. Wasco, 396 Union St., Allentown, Pennsylvania; Theodore O. Kine, University of Wyoming College of Pharmacy, Laramie; S. Johnson, New England College of Pharmacy, Boston; Hugh C. Muldoon, Duquesne University, Pittsburgh; Edith Graef, Shipley Road, RFD 3, Wilmington, Del., du Pont; Dorothy E. Collier, 7405 Quincy Ave., S. W. Sabo, 5720 W. 54 St., Paul Hanley and William Waldurot, all of the City Hospital, Cleveland; Walter Wolman, 535 N. Dearborn St., B. E. Conley and Veronica Conley, all of the American Medical Association, Chicago; Frances I. Blair, University of New Mexico, College of Pharmacy, A.S.H.P., A.Ph.A., A.A.A.S. and University of New Mexico; M. R. Jacobson, M. V. Hospital, Toledo; George C. Walker, 46 Gerrard St., E., Ontario, Canada, Ontario College of Pharmacy; J. S. V. Allen, Bethany College, Bethany, West Virginia; James B. Lackey, 1012 Walnut St., Philadelphia 5, Blakiston Company; A. M. Mattocks, Washington, D. C., American Pharmaceutical Association; C. F. Archambault, U.S.P.H.S., Washington, D. C. U.S.P.H.S.; H. W. Decker, Cleveland Clinic, A.S.H.P.H.; E. Schapiro, 20 Main St., Orange, N. J., Organon, Orange, N. J.; E. N. Zorn, P.O. Box 313, Hines, Ill., V. A. Hospital; A. R. Biamonte, Bound Brook, N. J. Calco Chemical Division; W. H. McElroy, People's Hospital, Akron, R. F. Lovell, City Hospital, Akron, Mary Morgan, Childrens' Hospital, Wm. Slabodnick, Massillon City Hospital, and Margaret Trevis, St. Luke's Hospital, all representing the A.S.H.P.; W. C. Hays, 7300 York Road, Veterans Hospital; Gertrude Horsch, 1092 Rushleigh Road, Cleveland Heights, Hopkins Clinic; Oliver Kamm, Parke, Davis and Co., Detroit; Joseph Kalish, Schenley Laboratories, Lawrenceburg, Ind.; Florence M. Mickey, Broadview Road, Bucksville, Ohio, VA Hospital, Bucksville; Thos. E. Sisk, St. Joseph Hospital, Lorain, Ohio; and Klotilda Baclawshi, University Hospital of Cleveland.

## New Books

**The National Formulary**, produced and edited by The Committee on the National Formulary, Justin L. Powers, Ph.D., Chairman. The ninth edition. The eighth revision. 1950. 877 pages. The American Pharmaceutical Association. Printed by the Mack Printing Company. Price, \$8.00.

The Committee of Revision has conducted its work by correspondence, through the **National Formulary Bulletin**, and by occasional meetings of the full Committee and various sub-committees. The actual revision work has been carried on in the laboratory and offices of the American Pharmaceutical Association located in its own building in Washington, D. C. The ninth edition represents the culmination of four years of planning and work by the Committee on National Formulary, the staff of the A.Ph.A., and hundreds of collaborators connected with college, governmental, institutional, and industrial laboratories. Prior to the selection of drugs to be included in **National Formulary IX**, surveys were made and information was furnished by practicing pharmacists to determine the extent of the use of drugs, based upon experience in prescription compounding and other demands for such drugs. The Committee also determined the therapeutic value of the drugs being used. As a result of these investigations a total of 162 items official in **N.F. VIII** were not admitted to **N.F. IX**. 155 drugs for which official standards would not otherwise have been provided have been added to **N.F. IX**. The **National Formulary** is now on a continuous revision basis so that the publication of **N.F. IX** is incidental to the continuous research and development of effective standards of drugs of demonstrated therapeutic value or extensive use. Changes and corrections, if they become necessary will be published in both editions of the Journal of the American Pharmaceutical Association and if supplements are published, they may be obtained without cost. Needless to say, **National Formulary IX** is a fit companion to the other legal standard, the **United States Pharmacopeia XIV**, both of which became official November 1, 1950. It is a "must", not only in all places as required by law, but also in the hands of students of pharmacy and everyone having any contact with pharmacy, either professional or industrial.—R.A.L.

**Marriage and Family Relationships**, by Robert Geib Foster, the University of Kansas and the Menninger Foundation. Revised edition. 1950. 316 pages. The Macmillan Company. Price, \$4.00.

As the author himself says, the First Edition of the book was written, not to repeat the abundance of statistical and factual information available in the many good books that have been written upon every phase of marriage and family life, but to emphasize the personality and relationship phases of marriage and family life. For

much of this text he has drawn upon his years of experience as a parent, teacher, and counselor and has leaned heavily upon the excellent work of others.

In the Revised Edition the author calls attention to the fact that we have passed through a world war. Young men and women by the hundreds of thousands have been overseas fighting that war. Now they have returned. The urge to marry and establish their own homes seems to be a paramount desire, as has always been the case from the cave man era. There is a common belief among young people that conditions now are very different from those their elders experienced as they grew up, but the stresses and strains of living seem not to have lessened. They may be somewhat different than those experienced in days of war. It is to this younger generation the author addresses the Revised Edition but his discussions will be quite as helpful to the elders from whom advice may be sought. The author's own words are thought provoking when he says, "The essential and basic problems of growing up, getting married and living one's family life successfully are no different than formerly, but the circumstances of living are different for the young, and baffling to their elders. The solution to a way of living peacefully and in harmony with our family, our associates, and with other countries, seems not to have been found. Science has given man the tools of destruction on the one hand, and the knowledge for saving and healing human life on the other. The conflict between these self-destructive and self-preservative tendencies in mankind constitutes the basic problem which the next generation must solve. The choice must be made between Love and Hate. Love leads to constructive acts and accomplishments, whereas Hate leads to self-and world-destruction."

In the opinion of the reviewer, the author has written the most satisfactory book on the subject. Probably no one, other than the physician and perhaps the minister, comes into more intimate contact with people than the pharmacist and it behooves us to prepare ourselves to be as helpful as possible to those with whom we have a daily contact. Furthermore, the subject which the author so intelligently discusses, is one of the basic problems of Public Health.—R.A.L.

**Step by Step in Sex Education**, by Edith Hale Swift, A.B., M.D., Visiting Lecturer to Wayne University, Detroit, and Director of Family Consultation Service, Detroit. 1950. 207 pages. The Macmillan Company. Price \$2.50.

The author has attempted, and with success, to present the scientific facts and social customs and obligations as regards sex from the time the child shows an interest in body structure and function until the consummation of marriage. She has used the dialogue form of presentation. Four characters are involved, a father, a mother, a daughter and a son. By so doing the information is presented from the viewpoint of

both sexes. At times the dialogue seems to become stilted and boring. The reviewer has never been impressed by the Socratic system of teaching by asking and answering questions. To accomplish an objective it is quite necessary to have intelligent questions asked in the proper sequence. This the child does not do. His question is the result of a curiosity on the spur of the moment and some times he acquires the "Why" habit. When the child reaches the age of reasoning and understanding, it would seem basic facts presented in logical order would be a more effective method of teaching. The author's method has pointed the way which may be very helpful to the intelligent parent and the text has been highly commended by a reviewer in *Hygiea*. We commend the author for her effort to help parents in this difficult field of child and youth training.—R.A.L.

**Principles and Practice of Surgery**, by Jacob K. Berman, A.B., M.D., F.A.C.S., Associate Professor of Surgery, Indiana University School of Medicine, Associate Professor of Oral Surgery, Indiana School of Dentistry, Chief Consultant in Surgery, Billing's Veteran Administration Hospital, Fort Benjamin Harrison, Indiana; Director of Surgical Education and Surgical Research, Indianapolis General Hospital. 1950. 1378 pages, 429 illustrations. The C. V. Mosby Company. Price \$15.00.

No one but a skilled surgeon could adequately review this monumental work. What impressed the writer, is the emphasis the author places upon a knowledge of the basic sciences in the practice of surgery, whether it be a science or an art. For example, he says, "Science may be defined as systematized knowledge. Since the practice of surgery defies exact formulation, it must remain an art, or a system of knowledge made efficient by mental and physical skill. Obviously, the more perfect the scientific part of surgery becomes, the more useful and beneficial will be the art of surgery. The basic sciences then must be learned, reviewed, and applied to the clinical practice of medicine. This is doubly true in the application of surgical measures for the care and cure of diseased processes. A knowledge of embryology enables the surgeon to understand congenital anomalies; anatomy is necessary in diagnosis and operative procedures; histology helps him understand pathological states; and etiology often teaches him how to avoid and correct them. Applied physiology is paramount in the practice of surgery. Such states as anoxia, shock, hemorrhage, endocrine imbalance, and subhydration are but a few of many examples that may be mentioned. A knowledge of biochemistry is necessary for the proper evaluation of such states as acidosis, alkalosis, tetany, and calcium imbalance and may point the way for a clearer concept of the formation of biliary and renal calculi. The sterols alone may open the door to the secrets of such diversified conditions as nerve and endocrine function, carcinoma, biliary calculi and cardiac disease. This book is written with the idea of correlating the basic sciences with the funda-

mental principles of surgery. Upon such a foundation can be erected the structure of clinical surgery—etiology, diagnosis, symptoms and signs, prognosis and treatment, even in the minutest detail of technique."

The writer can think of no greater justification for the writing of a book than the author has set forth in this statement. A casual perusal of the text shows the author has carried out his declaration well. Would that we had authors in the field of pharmacy who in writing texts, would follow a similar pattern.—R.A.L.

**Garden Flowers in Color**, by G. A. Stevens. 320 pages. Highly illustrated. The MacMillan Company. Price \$2.95.

Every page is crowded with photographs of garden flowers in color, beautifully done on excellent paper. Many plates cover the entire page. The collection includes many drugs plants. Cultural directions are included. A beautiful and instructive book for those interested in the study and cultivation of flowers.—R.A.L.

**Physical Chemistry for Premedical Students**, by John Page Arnsden, Professor of Chemistry, Dartmouth College. 1950. Second Edition. 317 pages. Illustrated. McGraw-Hill Book Company, Inc. Price \$4.25.

The understanding of the basic principles of physical chemistry has become a "must" in the education of the medical student. The same basic principles are necessary in the training of the pharmacist. Therefore, in planning the longer pharmaceutical curriculum, pharmaceutical educators are including a course in physical chemistry in their program. It is impossible to give a course that will cover every aspect of the subject. It is fortunate that Dr. Arnsden has chosen to write a text covering the basic principles and has given problems at the end of each chapter that makes it possible for the student to understand the application of these principles that are essential in the daily practice for his profession. Experience in the use of the First Edition has enabled the author to minimize the less important phases of the subject and emphasize the more important ones in the Second Edition, thus better adapting the subject matter to the practical needs of the professional student.—R.A.L.

**History and Trends of Professional Nursing**, by Deborah MacLurg Jensen, R.N., B.S., M.A., Assistant Director School of Nursing, St. Louis City Hospital; Instructor in Nursing Education and Sociology, University of Missouri; Formerly Instructor or Supervisor in Nursing Education in several institutions including, Simmons College, Boston, University of Minnesota, University of Chicago, and Washington University, St. Louis. 1950. Second Edition. 365 pages. Illustrated. The C. V. Mosby Company. Price \$3.25.

In the First Edition (History of Nursing, written at the outbreak of World War II) the author declares that the modern approach to the

study of history is sociological. "Only thus is it possible to fully appreciate the significance of the broad current of events which, out of the past, flow into the future and which will profoundly affect the lives of every one of us, both individually and as a profession. Approaching the subject from this angle, the nurse will reach a fuller understanding of her place in the society of the future. She must, however, learn it from the background of the past, and from those other currents of our social structure by which her own profession has been influenced and moulded." This same philosophy has been carried into the present edition and the title has been changed to **History and Trends of Professional Nursing** since this title more adequately indicates the scope of the book. Experiences during World War II were responsible for more accurately defining the various fields of nursing as a community service, and pointed the way to special fields of nursing activity. In other words, nursing as a profession, approached a maturity in the war which gave it a definite place in the community of the health sciences. The moral for us pharmacists is, the necessity of historical study for the development of any profession.—R.A.L.

**Elements of Human Physiology**, by Miriam Scott Lucas, B.S., Ph.D., Assistant Professor, Department of Biological Science, Michigan State College. 1950. Second Edition. 357 pages. 158 illustrations, 2 in color. Lea and Febiger. Price \$4.75.

Authors of textbooks of physiology for college students have the problem of not making them so elementary that they are reduced to the high school level. At the same time they must not be made so technical that they are elevated to the level of the specialist in this field. The subject of physiology covers such a vast area that the author of the present text has chosen to confine the subject matter to the field of human physiology with numerous references to animal experimentation. The author has made no effort to avoid controversial subjects, which is a common practice with textbook writers. We think the procedure is sound educationally because it is the controversial problem that stimulates the student to study and experiment. It also prevents dogmatic teaching. It must be remembered that what is non-controversial today, may in the light of further experimental study, become controversial tomorrow. Such is the history of science. The author, in writing the Second Edition, has had the advantage of his own teaching experience and that of others, to revise all and rewrite some chapters and add others in order to make the latest edition more useful to both student and teacher.—R.A.L.

**General Chemistry**, by John Arrend Timm, Professor of Chemistry, Director of School of Science, Simmons College. Second edition, 1950. 764 pages. Illustrated. McGraw-Hill Book Company, Inc. Price \$4.50.



No brief description such as is permitted in this journal can give proper credit to this text. The first edition was written with the idea of creating a good teaching tool in a tremendously large field. This is difficult to do and serve a multitude of teachers, each of whom has his own specific method of presentation. The author believes in a certain amount of repetition for new ideas are not absorbed by the student on the first exposure. This is certainly a sound educational statement. He therefore presents the student with a birdseye view of the problem and later amplifies the discussion. The second edition enlarges upon our more recent knowledge of structure of matter and the forces operating between structure particles. The text is written in an easy conventional style with enough historical data to make the reading of it fascinating and profitable to the student of any science, pure or applied. In the mechanics of book making the publishers have maintained their reputation.—R.A.L.

**Textbook of Anatomy & Physiology.**—By Carl C. Francis, A.B., M.D., Assistant Professor of Anatomy, Department of Anatomy, Western Reserve University and G. Clinton Knowlton, Ph.D., Assistant Professor of Physical Medicine, Emory University, Medical School. Second edition, 1950. 624 pages. Illustrated including many colored plates. C. V. Mosby Company. Price \$6.25.

The textual material has been largely rewritten, rearranged and improved. The anatomical and physiological subject matter has been well integrated for effective teaching. The illustrations are well chosen and the mechanics of the text is excellent. The book was written with the needs of the nurse in mind, but is well suited for general students on the college level.—R.A.L.

**Principles of Chemistry** by Joseph Roe, Ph.D., Professor Biochemistry, School of Medicine, George Washington, University; formerly instructor in Chemistry, Central School of Nursing, Washington, D. C., Seventh edition, 1950. 427 pages. Illustrated. C. V. Mosby Company. Price \$3.50.

An introductory text covering the elements of inorganic, organic and physiological chemistry for nurses and students of home economics and applied chemistry. New material has been introduced covering molecular motion, diffusion, osmosis, X-rays, atomic fission, metabolism, vitamins and certain historical aspects of chemistry and biology. The author has stressed especially the applications of biochemistry to nursing.—R.A.L.

**A Laboratory Guide in Chemistry** by the same author. Second edition, 1950. 216 pages. Illustrated. C. V. Mosby Company. Price \$2.25. Additional exercises have been added especially in the organic

field. The experiments are practical and well designed for the class of students the author has in mind.—R.A.L.

**Microbiology with Application to Nursing**, by Catherine Jones Wilton, M.A., Associate Professor of Biology, Simmons College, 1950. First Edition. 692 pages. 210 line drawings and microphotographs. McGraw-Hill Book Company, Inc. Price, \$4.50.

The author has designed the book specifically for student nurses. She has made a complete presentation of the morphology, physiology, classification and techniques of microbiology. Emphasis is placed upon the principles of chemotherapy and immunology, the major pathogenic organisms and the newer developments in the field of antibiotics and vaccines. The writer has noted a trend in the writing of textbooks, to get away from the stereotyped method of presenting subject matter in tabular form. Instead it is presented in an easy conversational style with the proper use of connective tissue to make it interesting to the student. This the author has done most satisfactorily.—R.A.L.

**Evaluation Physical Education**, by M. Gladys Scott, Professor of Physical Education, State University of Iowa, and Esther French, Professor and Head of Department of Health and Physical Education for Women, Illinois State Normal University, 1950. 348 pages. Illustrated. The C. V. Mosby Company. Price \$4.00.

The value of physical education in our schools and colleges has long been a debatable subject. Its value, of course, depends upon the benefit derived from it by the student. The question is how to measure that benefit. Many teachers, the authors say, spend too much time in mere repetition of what the student already knows and in having him practice skills he has already mastered. Better teaching can be done by the intelligent use of tests as a part of the evaluation process. The purpose of this book is to give a non-technical discussion of testing in physical education. The tests chosen for inclusion in this text have undergone experimentation and have proved valuable but no claim is made that they are the final answer. A real service is being rendered when methods are worked out that will enable us to measure the value of courses in physical education, and of course, we will have a guide for better teaching.—R.A.L.

**Laboratory Manual for Pharmacognosy**, by Edward P. Claus, Ph.D., Professor of Pharmacognosy, University of Pittsburgh School of Pharmacy, 1950. Second Edition. 300 pages. The C. V. Mosby Company. Price \$3.25.

In prefacing the Manual, the author quotes from the section of the report of The Pharmaceutical Survey entitled "Pharmacognosy in the Pharmaceutical Curriculum" which states in part.—"It is no longer necessary to make expert plant anatomists out of undergraduate pharma-

cy students through courses in pharmacognosy . . . A knowledge of the chemical constituents and the action of drugs should be stressed, and limitations should be placed on the study of origin and anatomy of drug plants." To the reviewer, the first statement in the quotation is not a statement of fact for in fifty years of contact with pharmaceutical teaching he has never seen an "expert plant anatomist" made by any undergraduate course in pharmacognosy. Those that are responsible for this statement would probably agree that it is absurd to expect an expert to be made in any three hour, one or two semester elementary course in pharmacognosy, nor for that matter is it possible to produce experts in any pharmaceutical area by any course in the pharmaceutical curriculum. Even in the field of chemistry, where there are more courses than in any other field, ask the chemist if he thinks a student has qualified as an expert in chemistry when he completes these courses. You know the answer before you ask the question. We question also the wisdom of the last statement made in the quotation taken from *The Pharmaceutical Survey*. We believe the study of the origin of drug plants and their histology and gross anatomy is as important to the field of pharmacy as is history, and microscopical and gross anatomy to the study and practice of surgery. Dr. Claus has presented the material based upon the biochemical classification and wisely has included, in an appendix, a number of exercises as an introduction to the study of plant tissues for the benefit of those students who are handicapped because of the lack of prerequisite courses. The time has not yet come when a comprehensive general course in pharmacognosy can be dispensed with as a basic professional course, unless, our objective in pharmaceutical education is to make the pharmacist an automaton. If that is the purpose then the next step is an automatic dispensing device.

It is a forward step in pharmaceutical literature when the ephemeral mimeographed manuals are replaced by printed guides. It lends dignity to the course and the subject. For this we should be grateful to the publisher, because, until a manual has a wide usage, it amounts to a contribution on the part of the publishers.—R.A.L.

**Eyes and Industry** (formerly *Industrial Ophthalmology*), by Hedwig S. Kuhn, M.D., Industrial Ophthalmologist, Hammond, Indiana. 1950. Second Edition. 378 pages. 151 illustrations including 3 colored plates. The C. V. Mosby Company. Price \$8.50.

The fact that industrial ophthalmology is emerging as a specialty is indicated by the fact that the American Academy of Ophthalmology and Otolaryngology and the Section of Ophthalmology of the American Medical Association have set up a Joint Committee of Industrial Ophthalmology. It is obvious that in order "To produce, one must see, have eyes, and use them effectively; to avoid waste through errors and inaccuracies, one must see, have eyes, and use them effectively; and, to

have two eyes or even one eye, one must guard them by physical protective devices." The author has practiced as an oculist and as a consultant for years in an industrial community and being associated with the Department of Industrial Psychology at Purdue University and with the extensive researches conducted there in the related fields of psychology and vision, has enabled her to produce this comprehensive text on industrial ophthalmology. It is important that the pharmacist keep in touch with these ever increasing developments in industry that affect his daily work—R.A.L.

**Annual Reprint of the Reports of the Council on Pharmacy and Chemistry of the American Medical Association**, with the comments that have appeared in the *Journal of the American Medical Association* for the year 1949. Publication date, July 27, 1950. 227 pages. J. B. Lippincott Company. Price \$2.00.

The character of the work of the Council is well known. Its work is continuous and the reports are published weekly in the Association's *Journal*. The collection and printing of these reports in one handy indexed volume, makes it possible for physician and pharmacist to locate immediately the value or worthlessness of a preparation with which they are not familiar. What is also important, it gives the methods of clinical study and the evaluation of therapeutic agents and the rules under which the Council carries on its work. It clearly defines the obligations of physician and pharmacist relative to the handling of narcotic prescriptions under the Harrison Narcotic Act and also those laws affecting the prescribing and dispensing by physicians and pharmacists under the Federal Food, Drug, and Cosmetic Act. An indispensable book for both student and pharmacist.—R.A.L.

**Management of Obstetric Difficulties**, by Paul Titus, M.D., Obstetrician and Gynecologist to St. Margaret Memorial Hospital, Pittsburgh, and holder of many consultant and professional positions including the Secretaryship of the American Board of Obstetrics and Gynecology. 1950. Fourth Edition. 1046 pages. 446 illustrations and 9 color plates. The C. V. Mosby Company. Price, \$14.00.

The author has not attempted to cover the normal physiology of pregnancy, labor and the uncomplicated puerperium, but has confined his discussions to those indicated by the title. Its greatest usefulness is to advanced students and those engaged in special training and practice. Nevertheless the discussions on the causative factors of sterility, and treatment of sterility, the diagnosis and duration of pregnancy, and diseases of the generative tract are the concern of all members of the related health professions. The mechanics of the book are excellent.—R.A.L.

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